The independent MONTHLY magazine for T/S1000,ZX81 users

timex sinclair user

48516

$2.95

Issue #1
COLLECTOR'S ISSUE

WRITE A PROGRAM AND WIN A FORTUNE

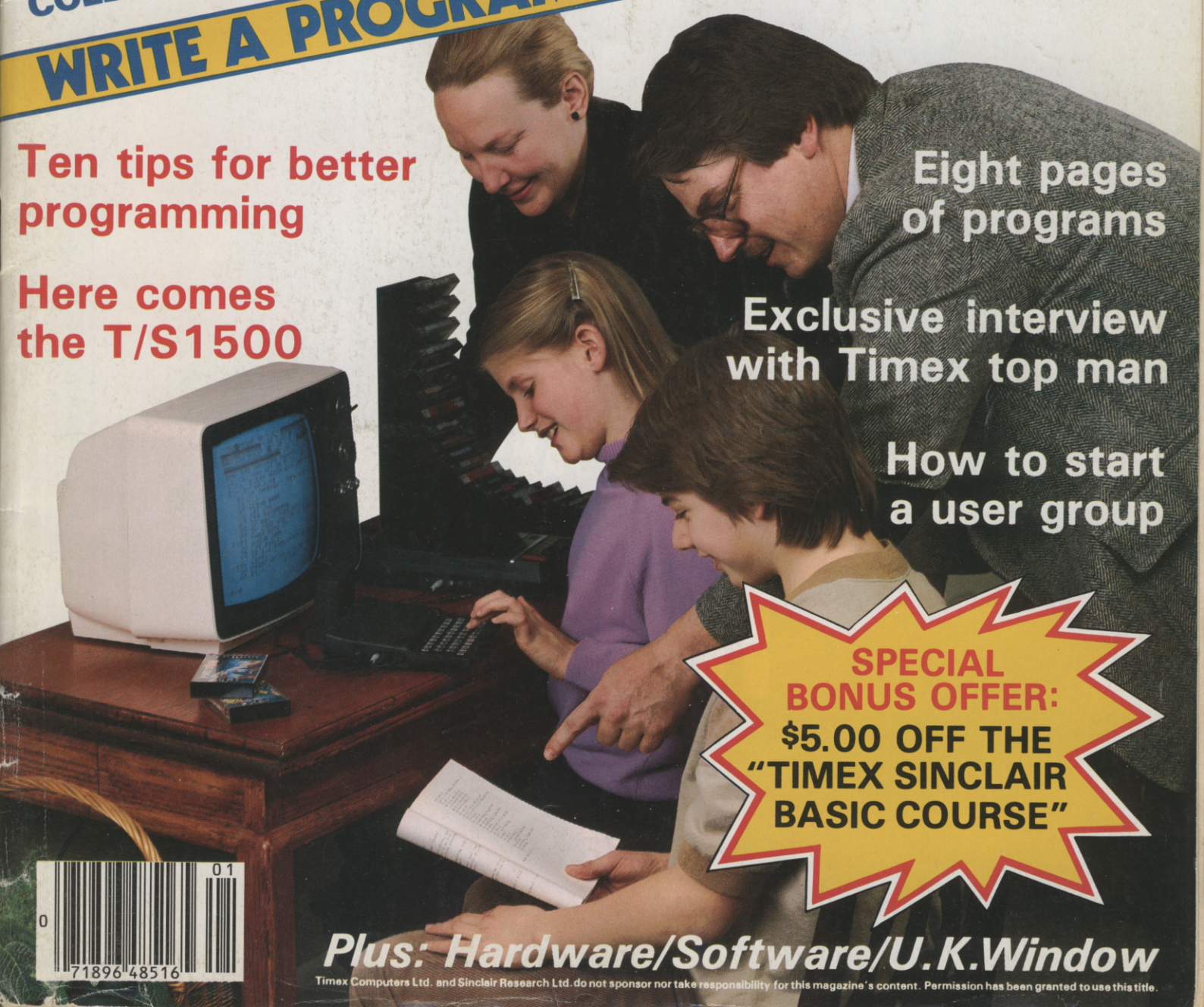
Ten tips for better programming

Here comes the T/S1500

Eight pages of programs

Exclusive interview with Timex top man

How to start a user group

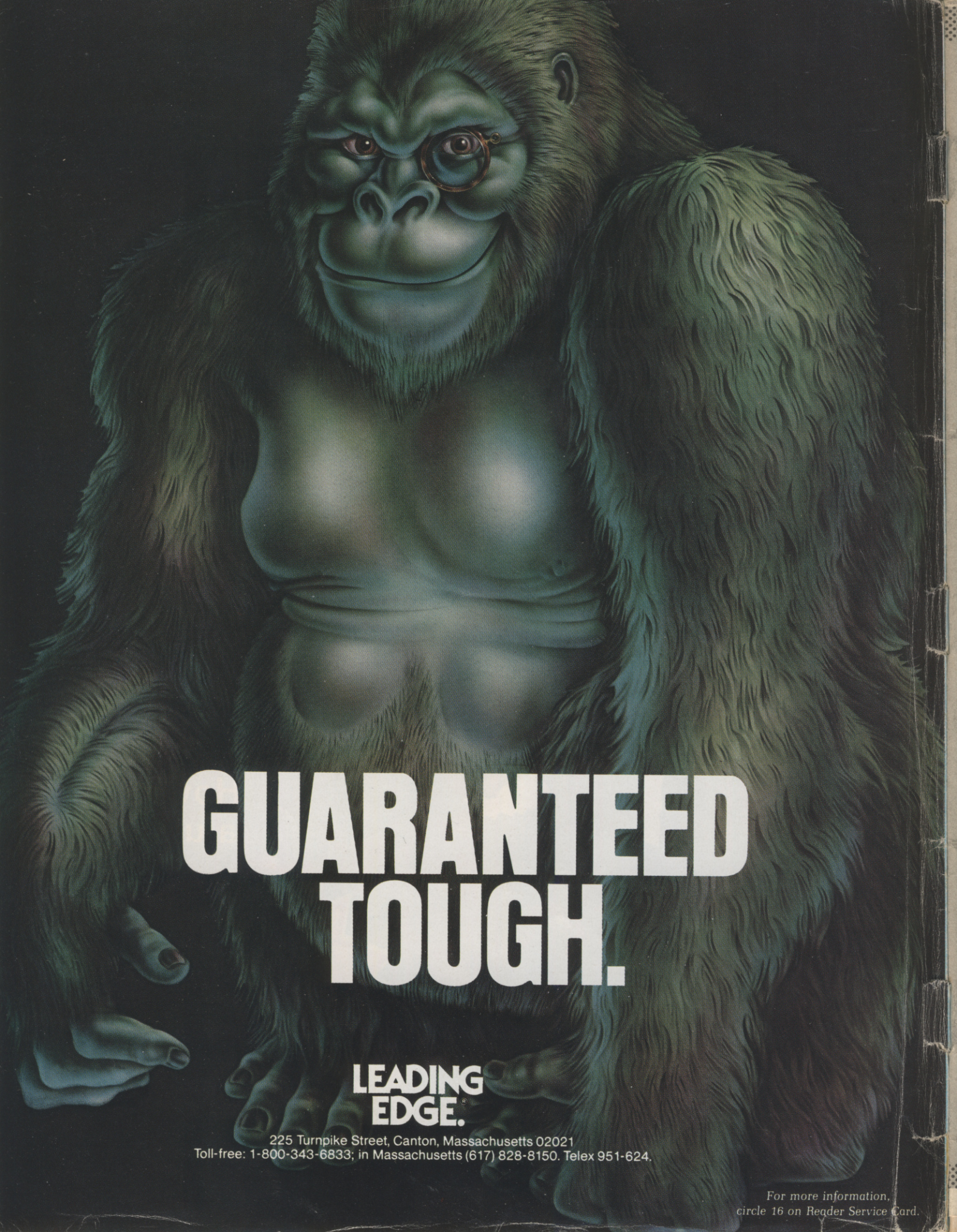


SPECIAL BONUS OFFER:
$5.00 OFF THE "TIMEX SINCLAIR BASIC COURSE"

Plus: Hardware/Software/U.K.Window

Timex Computers Ltd. and Sinclair Research Ltd. do not sponsor nor take responsibility for this magazine's content. Permission has been granted to use this title.

0 71896 48516 01



For more information,
circle 16 on Reader Service Card.

PLACE STAMP HERE

timex sinclair user

SUBSCRIPTIONS
49 LaSalle Avenue
Buffalo, N.Y. 14214

PLACE STAMP HERE

timex sinclair user

SUBSCRIPTIONS
49 LaSalle Avenue
Buffalo, N.Y. 14214

PLACE STAMP HERE

timex sinclair user

READER INFORMATION SERVICE
49 LaSalle Avenue
Buffalo, N.Y. 14214

GET IT MONTHLY!

timex sinclair user

To get your subscription started,

PHONE NOW

800-543-3000 and ask for operator 243. Have your VISA or MASTERCARD ready, or

PRINT OR TYPE YOUR NAME

and address on the attached card. Mail the card to us and we'll start your subscription immediately.

SUBSCRIBE WITH CONFIDENCE.

If you ever feel that TIMEX SINCLAIR USER isn't helping you get more from your computer, you may cancel at any time. We will refund the value of any unmailed issues and you still keep your free $15.00 "Packrabbit" software game.

MAIL TO

SUBSCRIPTIONS
49 LaSalle Avenue
Buffalo, N.Y. 14214

FREE INFORMATION

To get more information about any products advertised or mentioned in this month's issue just take these three steps.

1. *Print or type your name and address on the attached card.*
2. *Circle the number(s) on the card that correspond to the reader service numbers at the bottom of the advertisement or article.*
3. *Mail the card and free information will be mailed back to you.*

GET IT MONTHLY!

timex sinclair user

To get your subscription started,

PHONE NOW

800-543-3000 and ask for operator 243. Have your VISA or MASTERCARD ready, or

PRINT OR TYPE YOUR NAME

and address on the attached card. Mail the card to us and we'll start your subscription immediately.

SUBSCRIBE WITH CONFIDENCE.

If you ever feel that TIMEX SINCLAIR USER isn't helping you get more from your computer, you may cancel at any time. We will refund the value of any unmailed issues and you still keep your free $15.00 "Packrabbit" software game.

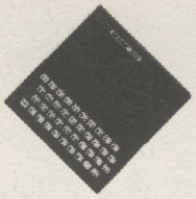
MAIL TO

SUBSCRIPTIONS
49 LaSalle Avenue
Buffalo, N.Y. 14214

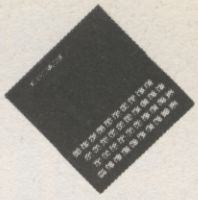
FREE INFORMATION

To get more information about any products advertised or mentioned in this month's issue just take these three steps.

1. *Print or type your name and address on the attached card.*
2. *Circle the number(s) on the card that correspond to the reader service numbers at the bottom of the advertisement or article.*
3. *Mail the card and free information will be mailed back to you.*



Subscribe Now!



PLEASE PRINT

NAME

STREET

CITY

STATE ZIP PROV. CODE

COUNTRY

U.S.A.
ONE YEAR
(12 ISSUES) $29.95

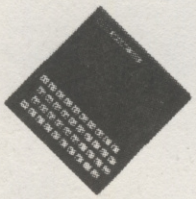
CANADA
ONE YEAR
(12 ISSUES) $35.95

PAYMENT ENCLOSED
☐ CHECK ☐ MONEY ORDER
☐ VISA ☐ MASTERCARD

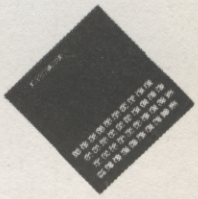
CARD NUMBER EXPIRES

SIGNATURE

Allow 6 to 8 weeks for delivery.



Subscribe Now!



PLEASE PRINT

NAME

STREET

CITY

STATE ZIP PROV. CODE

COUNTRY

U.S.A.
ONE YEAR
(12 ISSUES) $29.95

CANADA
ONE YEAR
(12 ISSUES) $35.95

PAYMENT ENCLOSED
☐ CHECK ☐ MONEY ORDER
☐ VISA ☐ MASTERCARD

CARD NUMBER EXPIRES

SIGNATURE

Allow 6 to 8 weeks for delivery.

Reader Service Card

CIRCLE FOR INFORMATION
Zip code necessary.
This card valid for 90 days.

PLEASE PRINT

NAME

STREET

CITY

STATE ZIP PROV. CODE

COUNTRY

1400

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70

Timex announces a new personal printer. Just for the record.

Now Timex brings you a printer to go with your Timex Sinclair 1000™ or Sinclair ZX81.

The new Timex Sinclair 2040.

32 columns wide. Two lines per second. With full graphics and text capability based on a dot matrix print mechanism.

The price: just $99.95.

The TS 2040 operates silently in two different modes:

☐ Full-screen printing with single-key copy command.

☐ Program-controlled printing mode allowing for custom control of the printing format.

A printer that can give you a permanent record of your computer programming at a very affordable price.

Just what you'd expect from Timex.

TIMEX COMPUTERS

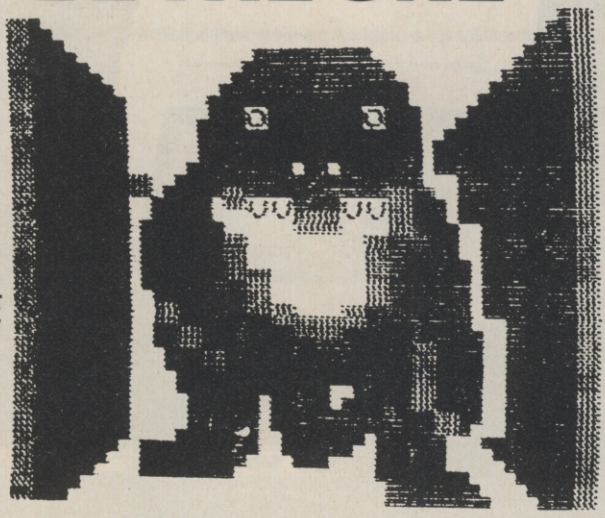
© Timex Computer Corporation 1983

For more information, circle 17 on Reader Service Card.

"IF I HAD TO CHOOSE JUST ONE PROGRAM TO IMPRESS AN AUDIENCE WITH THE CAPABILITIES OF THE TS1000/ZX81, THEN '3D MONSTER MAZE' WOULD BE THE ONE"*

"THE GRAPHICS ARE INCREDIBLE"*

"FINEST MACHINE CODE GAMES AVAILABLE"†



"BRILLIANT... UNDOUBTEDLY ONE OF THE BEST"•

Reviews are from
*ZX COMPUTING
†John Rowlands, Product Manager U.K.'s largest Sinclair distributor
•Personal Computer World

3D MONSTER MAZE
Gamestape 4
Actual screen TS1000/ZX81

PLUS AWARD WINNING BOOKS

MACHINE LANGUAGE PROGRAMMING MADE SIMPLE

Michael Roberts, *SYNTAX* Magazine wrote: "The idea of Machine Language 'made simple' appealed to me. It's the best explanation of Machine Language for Machine Language beginners I've seen. This introduction is a must."

THE COMPLETE SINCLAIR ZX81 & TIMEX TS1000 BASIC COURSE

The *SYNC* review says: "It has been said, 'It's not what something costs that counts; It's what it's WORTH!' That certainly seems true in the case of *The Complete Sinclair ZX81 & Timex TS1000 basic Course*. I would recommend this course highly."

UNDERSTANDING YOUR ZX81 ROM

by Dr. Ian Logan

SYNC Magazine said: "SYNC readers will recognize Dr. Logan as a major ZX80/81 expert whose writings are well worthwile. *Understanding Your ZX81 ROM* is no exception. Understanding Your ZX81 ROM should be high on your list."

Orders to: **MELBOURNE HOUSE SOFTWARE INC.**
Dept. CS 347 Reedwood Drive, Nashville, TN 37217

Visa and M/C orders can be phoned in: 615/361-3738

Dealer orders and queries: 800/251-5900 (ask for a Melbourne House operator)

TAPES:

☐	13941	Gamestape 1: 11 Programs-1K	$14.95
☐	13942	Gamestape 2: 3 Games-16K	$14.95
☐	13943	Gamestape 3: Catacombs Adventure-16K	$14.95
☐	13944	Gamestape 4: 3D Monster Maze-16K	$14.95
☐	13945	Gamestape 5: 3D Orbiter-16K	$14.95
☐	26446	Space Trek-16K	$14.95
☐	26359	Super Invasion-1K	$14.95
☐	26318	Wall Busters-1K	$14.95
☐	26472	10 Exciting Programs-1K	
☐	26284	Reversi-1K	
☐	26406	Toolbox-1K	$14.95
☐	26490	Basic Course 2 cassette pack	$7.50
☐	14026	Combat Flight-16K	$14.95

BOOKS:

☐	25895	The Complete Basic Course	$34.50
☐	25957	Machine Language Programming Made Simple	$14.95
☐	20922	The Complete Timex/Sinclair ROM Disassembly	$19.95
☐	26025	Not Only 30 Programs	$9.95
☐	25913	Understanding Your ZX81 ROM	$14.95
☐	51539	Ins and Outs of the Timex TS1000	$12.95

TOTAL: $ _____
Residents of CA, MD, TN please add sales taxes: _____
Add $2 for Shipping & Handling, foreign orders add $6: _____
TOTAL: $ _____

Enclosed is my check or money order for $_____.

Please charge my ☐ Visa or ☐ MasterCard Card # _____ expiration date _____

TSU5/3

Signature _____ Name _____

Address _____ City _____ State _____ Zip _____

MELBOURNE HOUSE SOFTWARE

For more information, circle 18 on Reader Service Card.

Contents

timex sinclair user

President
Terry Cartwright

Editor-in-chief
John Sterlicchi

Managing Editor
Joseph Gladstone

Art director
Vladyana Krykorka

Production editor
Bill Gladstone

Art assistants
Andres Hannach
Don Kletke
Gwen Egan

Technical advisors
Robert Fraser
Igor Nowikow
Tom Perrone

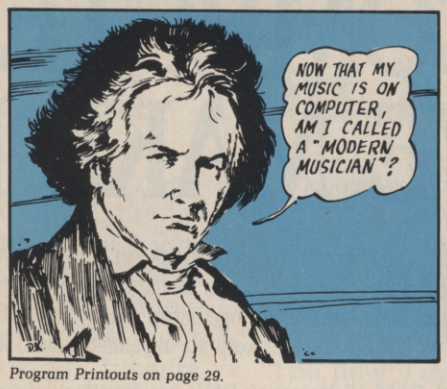
Editorial assistant
Becky Ashwell

Chairman
Richard Hease

Timex Sinclair User is published monthly by ECC Publications Inc. in conjunction with C.W. Communications.

If you would like to contribute to Timex Sinclair User, please send programs, articles or ideas for hardware projects to:
Timex Sinclair User
49 LaSalle Avenue
Buffalo, N.Y. 14214
Programs should be on cassette and articles should be typed. If you wish your material returned, enclose a stamped, self-addressed envelope.
We pay $20 for each program published and $100 per 1000 words for each article used.

© Copyright 1983
Timex Sinclair User
ISSN 0737-0881
Typesetting by
International Typesetting
Advertising manager
Bill York
Hajar Associates
(617) 444-3946



Program Printouts on page 29.

T/S1000,ZX81 in business on page 38.

TIMEXPECTATIONS 5
What to expect? TSU gives you a glimpse of the future

NEWS 7
Clive Sinclair now worth more than $200 million; British software invades U.S. market; T/S1500 to debut; and more

U.K. WINDOW 11
Long popular in Britain, specialized computer fairs and exhibitions may soon prove as successful in the U.S.

SOFTWARE 13
Packrabbit, Night Gunner, Cosmos and other programs reviewed

HARDWARE 16
An all-purpose voltage and temperature measuring system (Votem); an add-on that teaches your computer to say "Good morning!"; and more

INTERVIEW: DAN ROSS 19
Meet the man who clogged up Connecticut's phone system

USER GROUPS 27
Sue Mahoney's tips on starting a group like the one she formed in Boston

PROGRAM PRINTOUT 29
Six great programs, including one that allows you and your T/S1000,ZX81 to make beautiful music together

BUSINESS 38
James Biers discusses office applications and looks at business software

IN-DEPTH 43
Everything you wanted to know about the Z80 A central processing unit (but were afraid to ask)

CONTEST 50
Write a 2K program and become an instant author

HOW TO PROGRAM 55
Part One of John Gilbert's series on how to become an expert programmer

BOOKS 58
What kind of book can we expect from two academics? A delightful one

HINTS & TIPS 60
Follow our golden rules for better SAVEs and LOADs

STARTING OUT 63
Purchasing a T/S1000, ZX81 may be the start of a lifetime obsession

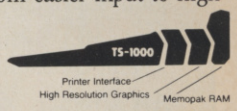
Next month

- Close-up on Clive Sinclair, the man who started it all
- A full listing of national user groups

and much more!

TIMEX MAKES THE COMPUTER, BUT WE MAKE IT TICK.

If you own a TS-1000 or ZX-81 computer and want to bring out the power within it, you'll want Memotech. From easier input to high quality output and greater memory, Memotech makes the add-ons you demand. Every Memotech peripheral comes in a black anodized aluminum case and is designed to fit together in "piggy back" fashion enabling you to continue to add on and still keep an integrated system look.

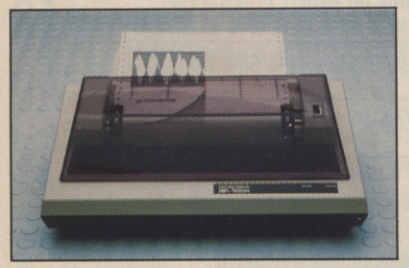


MEMOPAK RAM All Memopak RAMs are directly addressable, user transparent, are neither switched nor paged and no additional power supply is required. You can also choose the Memopak RAM which is just right for your needs. From economy to power. **16K RAM** The Memopak 16K RAM is the most economical way to add memory to your TS-1000. It is fully compatible with the Timex or Memotech 16K RAMs to provide you with up to 32K of RAM. The 16K RAM also offers additional add-on capabilities through its "piggy back" connection. **32K RAM** The 322K Memopak enables you to execute sophisticated programs and store large data bases and like the 16K RAM is fully compatible with Timex's or Memotech's 16K RAMs to give you a full 48K of RAM. **64K RAM** The 64K Memopak is powerful enough to turn your TS-1000 into a computer with capabilities suitable for business and educational use. It accepts such BASIC commands as 10 DIM A (9000). **MEMOCALC** Memocalc, our spreadsheet analysis software, enables TS-1000 users to perform complex number crunching routines with ease. With the 64K RAM a table of up to 7000 numbers with up to 250 rows or 99 columns can be specified. Quick revisions can be achieved by entering new data to your formula.

MEMOTECH KEYBOARD For ease of operation, the Memotech keyboard is a high quality standard typewriter keyboard, with TS-1000 legends. The keyboard is cable connected to a buffered interface which is housed in a standard Memopak case and plugs directly into the back of the TS-1000 or other Memopaks. **MEMOPAK HRG** The Memopak High Resolution Graphics, with up to 192 by 248 pixel resolution, enables display of high resolution "arcade game" style graphics through its resident 2K EPROM, programmed with a full range of graphics subroutines.

CENTRONICS PARALLEL AND RS232 INTERFACES Memotech's Interfaces enable your TS-1000 to use a wide range of compatible printers. The resident software in the units gives the complete ASCII set of characters. Both Memopak Interfaces provide lower case character capabilities and up to 80 column printing. The RS232 Interface is also compatible with modems and terminals.

SEIKOSHA GP 100A PRINTER The Seikosha GP 100A uses a 5x7 dot matrix printing format with ASCII standard upper and lower case character set. Printing speed is 30 characters/second with a maximum width of 80 characters. The printer uses standard fanfold paper up to 9-1/2 inches wide. The GP 100A is offered as a package including cable and interface. Other printer packages are also available through Memotech.



ORDER AT NO RISK. All Memotech products carry our 10 day money back guarantee. If you're not completely satisfied, return it within ten days and we will give you a full refund. And every Memotech product comes with a **six month warranty.** Should anything be defective with your Memotech product, return it to us and we will repair or replace it free of charge. **Dealer inquiries welcome.** To order any Memotech product use the order coupon or call our toll-free number **800/662-0949.**

TS-1000 is a registered trademark of Timex Corp.

MEMOTECH
CORPORATION

7550 West Yale Avenue, Denver, Colorado 80227, 303/986-1516, TWX 910-320-2917

Mail To: Memotech Corporation, 7550 West Yale Ave., Denver, CO 80227

Code: TS-05

	Price*	Qty.	Total
16K RAM	$ 49.95		
32K RAM	99.95		
64K RAM	149.95		
Memocalc	49.95		
Keyboard with Interface	99.95		
High Resolution Graphics	99.95		
Centronics Parallel Interface	74.95		
RS232 Interface	99.95		
Printer Cable	19.95		
GP 100A Printer Package**	399.00		
Shipping and Handling	4.95		$ 4.95
Tax (Colorado residents only)			
TOTAL			$

*All prices quoted in U.S. dollars. Prices and specifications subject to change without notice.
**Please add an additional $5.00 for printer shipping charges.
☐ Check ☐ MasterCard ☐ Visa

Account No. _____ Exp. _____

Name _____ (____) Phone number

Address

City State Zip

For more information, circle 19 on Reader Service Card.

What Can You Expect?

WELCOME to the first issue . . . the collector's issue . . . of TIMEX SINCLAIR USER, the independent magazine which aims to help you make the most of your machine. Look to TIMEX SINCLAIR USER each month for enjoyment, information, and uses for your machine and at least eight pages of programs! As well, each issue will include news of new products and events related to your computer, in-depth reports of new hardware and software, and reviews of available books. There will also be features and stories of general interest on how different people are using their computers for new and unusual applications.

This page will act as your view into the future; what's coming, what's being planned, what's new and

available for your machine. Through this page, we will give you a glimpse of the future, every month!

Even now, rumors abound about the new machines and add-ons that Timex and Sinclair will be introducing in the coming months. Last January, at the C.E.S. (Consumer's Electronics Show) in Las Vegas, TIMEX unveiled the T/S2000. It has color, sound, hi-res graphics and great (according to those who have used it) programming capabilities. And it's true, we've seen them, plug-in ROMs for the T/S2000. Perhaps this marks the end to your struggles with those long loading programs on sometimes unreliable tape recorders. It seems that ZX technology with cartridge convenience is just around the corner! Before this new computer hits the market, we will have all the details on it for you. Watch for our up coming T/S2000 features.

But even before the new T/S2000 comes on stream, which we hear will be the fall of '83, a new TIMEX SINCLAIR machine, the T/S1500, will make its debut. From what we have been able to learn, it is basically the T/S1000 with a built-in 16K RAM and a regular typewriter keyboard. This machine, too, will be taken apart and examined for you in an up coming issue.

On this page also, we will provide you with information and speculation on what is happening with Clive Sinclair and Sinclair Research. What about those rumors concerning a flat screen computer using ZX BASIC? It was spoken of as a "maybe" for 1983-84. Our guess is that TIMEX will wait on that one until the T/S2000 is well and truly launched — an event we look forward to with great excitement! In any event, this page will keep you ready for the new, the exciting, the useful, and the interesting additions to the Timex Sinclair computer line.

The new TIMEX printer seems to have answered some of the complaints about the ZX printer put out by Sinclair. The new TIMEX printer still uses narrow paper (about 4.5 inches wide) and a 32 character line length (the same as the screen), but it does use regular, untreated paper. The image you get is clear, reproduceable, and very readable. The ZX printer uses thermal paper and often gave results that were less than good. TIMEX SINCLAIR USER will feature these and other printers for your computer in future issues.

On page 63, you will find a one-page article titled, "Starting Out." This page is designed to help the new user get started . . . with as little frustration as possible. It will appear every month. It will, we hope, invite those who join the ranks of new computer users to take the plunge and get involved with their T/S1000. If you feel there are ideas or tips we have omitted that would make it still easier for that new, first-time user, please let us know.

And while we're on about letters from you, we will be able to provide help and tips to all users. Write in

with your questions. If we cannot answer your question, we are sure that there is a reader out there who can and will. Further we welcome any new or special uses or ideas for the T/S1000, ZX81 you may develop.

This is probably a good time to deal with the confusion that may exist about the differences between these two machines, the T/S1000 and the ZX81. Fundamentally, they are the same machine. The ZX81 has 1K of user available memory, while the T/S1000 has 2K. All ZX81 peripherals work equally well on the T/S1000 and, of course, the reverse is true (provided the 1K memory difference is taken into account). With a 16K RAM added onto them, the two machines are virtually inter-changeable. Any software from one will run on the other. If at times we talk about the ZX81 or the T/S1000, please read it as ZX81 AND T/S1000.

BYTE-BACK modules

64-K MEMORY $129.95 KIT

$139.95 ASSEMBLED & TESTED

In Stock!

With BATTERY BACKUP

the "ULTIMATE MEMORY" UM-64

FEATURES:

NEW

- Battery backup
- PROM/ROM socket
- Reset Switch.
- **BYTE-BACK EXLCLUSIVE FULL 64-K**

The O-8K area is available. You can execute a copy routine (provided) to copy the TIMEX ROM into the 0-8K area of RAM then flip a switch and you have your operating system in RAM. You can modify it and create your own customized operating system. Full details, examples & programs included.

WHY PAY MORE FOR LESS FEATURES?

GET THE "ULTIMATE MEMORY"

BYTE BACK'S UM-64

BYTE-BACK'S MD-1

MODEM $119.95 KIT

ASSEMBLED & TESTED $149.95

Use your phone to connect your "LITTLE" computer to the "LARGEST" computer networks in the world. With **BYTE-BACK's MD-1 MODEM** connected all you do is dial a phone number (usually local), press a few keys and watch the data appear on your TV screen. (Software is included) This **MODEM** can be used in either the "originate" or "answer" mode with selectable baud rate.

You can have immediate access to:
UNIVERSITY COMPUTERS, DOW JONES, UPI
COMPUSERVE PACKAGE WITH 5 FREE HOURS ONLY $34.95

As an extra bonus an RS-232 port is provided to allow you to drive all standard RS-232 peripherals. (75 to 9600 Baud.)

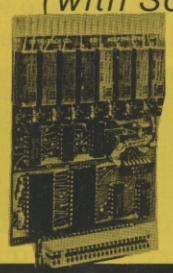
BYTE-BACK'S BB-1

CONTROL MODULE

$59.00 KIT *In Stock!*

ASSEMBLED & TESTED $69.00

- **8 Independent Relays** *(with LED status indicators)*
- **8 Independent TTL Inputs** *(with Schmitt trigger buffers)*



- By using a single POKE command you can change and latch the status of each of the 8 relays.
- Your computer can read the status of all 8 inputs by the use of a single PEEK command.
- A comprehensive manual is included that has complete application details.
- More than one BB-1 can be used at a time.

16K MEMORY UM-16 $59.95 kit **$69.95 assembled & tested.**

Battery backup, reset switch, PROM/ROM socket PLUS. . . . 1 year, 100% trade-in credit towards the **UM-64.**

RS-232 Module $59.95

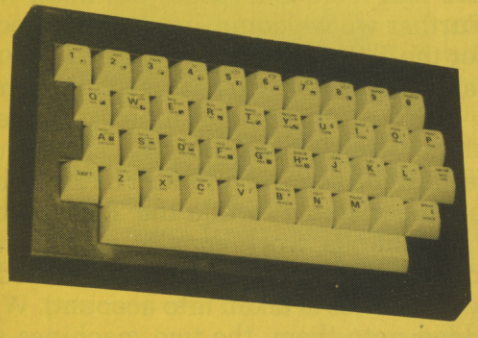
ASSEMBLED & TESTED **$69.95**

Allows you to connect your computer to all RS-232 printers & terminals

---

ALL MODULES CARRY 90-DAY WARRANTY

TRY BYTE-BACK MODULES FOR 10 DAYS WITH NO OBLIGATION



BYTE BACK

KEYBOARD

$89.95

We use the same key switch found in the expensive computers such as: Hewlett Packard, Texas Instruments, Atari, D.E.C. etc. The multi-colored key caps are the same type used on the IBM Personal Computer, but with the TIMEX ledgens.

EXPERIENCE QUALITY

---

1 **Shipping and Handling $4.95**

ORDER PHONE (803) 532-5812

ITEMS ORDERED: _____

Bill My ☐ Am. Exp. ☐ Visa ☐ M/C
Checks Accepted

Exp. Date _____ Card No. _____

Name _____

Address _____

City/State/Zip _____

Phone _____

Dealer Discounts Available

Mail To: **BYTE-BACK CO.**
Rt. 3, Box 147, Brodie Road
Leesville, S.C. 29070

AMERICAN EXPRESS · VISA · MasterCard

Clive runs up $200 million

CLIVE SINCLAIR is now officially worth more than $200 million. The London placing of shares, announced at the launch of the Spectrum (T/S2000) has now been settled with a value of $204 million being put on Sinclair Research, of which his personal share is about 85 percent.

A number of unnamed financial institutions, believed to be about 30, have agreed to buy 400,000 shares at $34 each, which is a total of $20.4 million for 10 percent of the company. The sale was heavily oversubscribed.

The latest figures available show that in the year to March, 1982 Sinclair Research made a profit of almost about $20 million on sales of about $55 million. It is expected that profit for the year to March this year will rise to $25 million. (This is an estimate.)

It is believed the company would like a full stock market listing within the next year.

Most of the money raised will be used to finance work on the Sinclair electric car.

The invasion of the U.K. softwarecrats

THE U.S.A. is the home of all new technology, right? Well almost right. When Timex and Sinclair introduced the affordable home computer, it was based on technology developed by Clive Sinclair and Sinclair Research. It had been out and in the hands of hundreds of thousands of enthusiasts in the U.K. for over a year before we saw it over here. Over there, they had a huge jump on hard and software development. U.S. programmers had a year to make up.

For the first time in a long time, manufacturers were taking the trek over the Atlantic to bring those U.K. products to us. It was unusual, different and most certainly beneficial. Companies such as Artic Computing, Psion, and Quicksilva have become quite well known here. Far from being a problem to us, it has allowed users here in the States to enjoy top-of-the-line programs right from the start.

Oh, by the way, this magazine first was seen in the U.K. as Sinclair User!

Clive in a marathon and in the money

Plan to visit these upcoming events

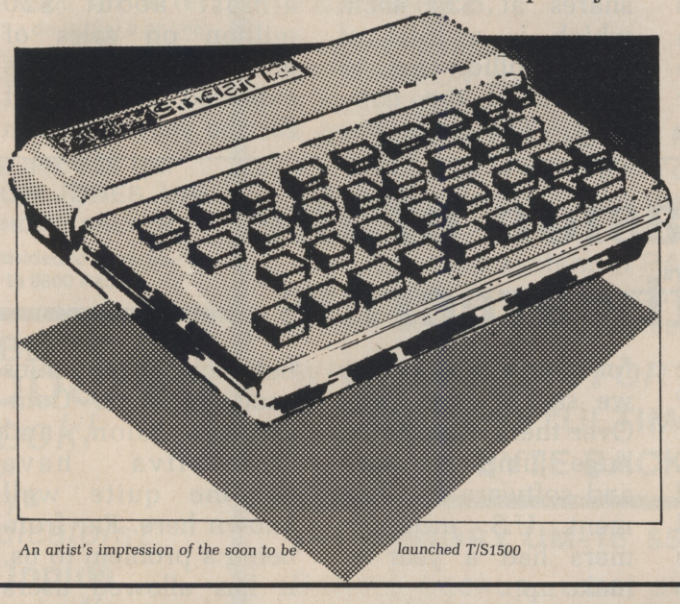
MAY
5-8 Anaheim Computer Showcase Expo, Anaheim, CA
5-8 Washington Computer Showcase Expo, Washington, DC
10-12 Mini/Micro-Northwest, Portland OR
12-15 San Diego Computer Showcase Expo, San Diego, CA
19-22 Houston Computer Showcase Expo, Houston, TX
22-24 Dexpo/East 83, St. Louis, MO
31-6/2 Canadian CAD/CAM & Robotics Expo & Conference, Toronto, Ont.

JUNE
1-3 Montreal Computer Show & Conference, Montreal, Que.
2-5 Seattle Computer Showcase Expo, Seattle, WA
5-8 International Summer Consumer Electronics Show, Chicago, IL
6-8 National Educational Computer Conference, Baltimore, MD
9-12 Kansas City Computer Showcase & Expo, Kansas City, MO
11-13 Houston/Produx 2000, Houston TX

Here comes the 1500!

FIRST they brought you the T/S1000! Next they promised the T/S2000! But from what we have been able to learn, the American public was not as accepting of the redone ZX81 (which is what the machine was originally called in the U.K.) and quite willing to wait for the more sophisticated machine. There were numerous complaints about the T/S1000's key board. Also many potential users felt the 2K user available memory was not enough, even though it was twice the memory found in the ZX81.

Timex has been quick to respond to these issues. On June 1, Timex plans to introduce their newest computer, the T/S1500. This new machine will be Timex's answer to the critics. It will have a built in 16K RAM and will boast a regular type keyboard with moveable keys. This new machine will have the simplicity of the T/S1000 plus the sophistication of the keyboard and the 16K RAM pack as "free add-ons."



An artist's impression of the soon to be launched T/S1500

From the limited information being given out by Timex, we have learned that this new in between machine will retail for about $100.00; keyboard, 16K RAM pack and the computer all for $100.00! That's a bargain! We hope they come through.

● News on the T/S2000 front is that it will be on the market "mid-year" according to Timex boss Dan Ross, in our exclusive interview appearing in this issue.

Sinclair's searching for super software

WITH MUCH media ado last April, Sinclair Research Ltd. licensed the Timex Corporation to sell its line of personal computers and peripherals in North America. Their first joint product, the Timex Sinclair 1000, hit the stores in August of last year and has been anteing upmarket share in thousands of outlets nationwide ever since. With retail sales in good hands, what's Sinclair up to now?

To find out, we checked in with Maggy Bruzelius, director of Sinclair's U.S. offices in Boston. She reported the company sold its one millionth computer last month — quite remarkable for a company just a shade past its third birthday.

The U.S. office is continuing to provide service to ZX80 and T/S1000, ZX81 customers. Shipping headquarters in Nashua, New Hampshire are filling orders for Sinclair Software, currently being advertised in several trade publications.

"We're also working as a clearing house for software in the States," said Bruzelius. "We're actively looking for GOOD programs that we could market in England and Europe."

Bruzelius said, "Specific software categories include games, household management and education. We're particularly intrigued by solid adult education programs, in language instruction or how to play the stock market, for instance," she said.

The next home electronics product scheduled to skyrocket out of the Sinclair Laboratories is a flat screen television. It will feature a black and white screen with a built-in FM radio, and will operate anywhere in the world. The flat Sinclair TV will retail for less than $100.

NEW RELEASES!

INTERNATIONAL PUBLISHING & SOFTWARE INC.

TINY LOGO

*Teach your children programming skills through a computer graphics language

*Comprehensive guide included

*Easy and fun to use

(Tiny Logo is a subset of the popular Mit Logo)

$19.95

COMPUTERIZED DIET PROGRAM

(For the whole family)

*Complete assessment of your eating habits and eating needs

*Totally nutritionally balanced menus developed especially for you

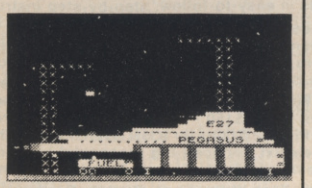
*Continual computer tracking of your personal progress

*Vinyl storage case and booklet included

(2 tapes) $29.95

THE TRADER TRILOGY

3 full 16K Programs!



It is hard enough to look at an amorphous hydrosillicon blob from P.S.I. never mind swing a deal with one. But when they ask to pick your brains....

$14.95

Fastload

A MUST FOR EVERY SERIOUS PROGRAMMMER

*Load and save programs up to 6 times faster
*Easy to use in your own programs
*Now available for 64K RAMS

$19.95

Fastload

TS1000-ZX81 OWNERS WIN $20,000

ENTER THE ULTIMATE ADVENTURE

Travel the world with your TS1000/ZX81 computer. Answer the 12 riddles and WIN!!

$19.95

SOFTWARE WRITERS
I.P.S. NEEDS YOUR PROGRAMS!

*Highest royalties paid

*Highest quality artwork and documentation

*Distribution throughout the world !

*Take advantage of our Fastload system.

CONTACT US SOON!

ASK YOUR DEALER FOR I.P.S. PRODUCTS BY NAME

*Dealer and distributor enquiries invited

For more information, circle 21 on Reader Service Card.

INTERNATIONAL PUBLISHING & SOFTWARE INC.
3948 Chesswood Dr., Downsview, Ontario
Canada M3J 2W6 (416) 636-9409

YOU CAN MAKE A FORTUNE IN MICROS!

THE MICRO COMPUTER BUSINESS WILL GROW FROM $10 TO $100 BILLION IN THE NEXT EIGHT YEARS! ARE YOU READY TO CASH IN?

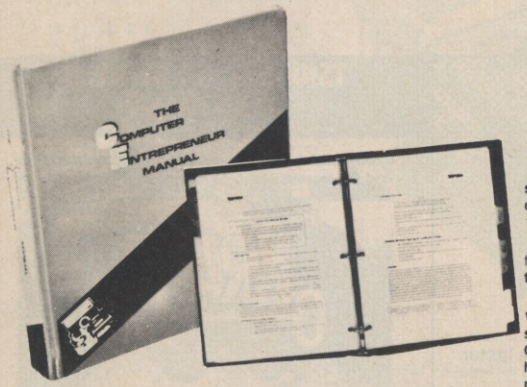
The **micro computer business** is predicted to grow from its present $10 billion to **$100 billion** before 1990! Imagine the possibilities this opens for you! No matter where you live, if you're starting up or presently in business, **no other industry offers you more opportunities!**

Now, finally, all the inside information you need to secure a prosperous future in this dynamic industry is available in **one place - THE COMPUTER ENTREPRENEUR MANUAL!** – An **immense** information source, compiled by our **inquisitive** research team, aided by a panel of **experts** and **business people** from **all areas** of the **computer industry!**

We present the inside story of **more than 100 lucrative computer businesses you can enter,** where you'll find the **real opportunities** for the eighties: from one man operations like **Programming Author, Word Processing Center** or **Consulting,** to **Systems House, Service Bureau, Computer Store etc!** Many at little or no investment! All the invaluable facts and figures: **How to start, Capital needs, Profit estimates and Margins, How to Sell and Market, How missing** technical or business experience **need not stand in your way, Source of Suppliers, etc!** Details that could take **years** to find out on your own!

We'll show you **inside tricks,** like how to **never again pay retail** for computer products and consumer electronics, **even for one item - right now,** while you're starting your business! How to get **free merchandise** and trade show **invitations, etc. This alone will more than pay** for the **manual!** You'll read **actual case histories** of other computer entrepreneurs, so you can **learn** from **their mistakes,** and **profit** from their **success stories! Where** you'll be **one year** from now depends on **your actions today!** Let us **show you how** to take the **first crucial steps!**

Order now and take **advantage** of our **limited introduction special, THE COMPUTER ENTREPRENEUR MANUAL,** and a **six month subscription to THE COMPUTER ENTREPRENEUR REPORT/NEWSLETTER** (so you're **always up-to-date** with the industry), **both** for **only $29.95! You must** be **convinced** on **how easy** you can **strike it rich** in the micro computer business - or you may **return** the manual for **a full refund** within thirty days! **USE OUR TOLL FREE NUMBER TO ORDER!**



EVERYTHING YOU NEED TO KNOW TO SUCCEED IN THE COMPUTER BUSINESS IS ALL IN THIS MANUAL!

THE COMPUTER ENTREPRENEUR MANUAL has the **answers** to **all your questions** about **selecting, starting** and **succesfully running a computer business!** There has **never** been such a **comprehensive collection** of **know-how** and **information** about this business **in one place! All the facts you need** to **plan** and **acheive your goals** in **easy-to-follow, step-by-step instructions!**

These are some of the **100-plus businesses** covered in **PART ONE** of the manual, with the facts on **How to start and run, Start-up Cost (Even** how to operate **on a shoestring),** What **profits to expect, Wholesale prices, Mark-ups, Suppliers, future outlook, case histories** for **each, etc:**

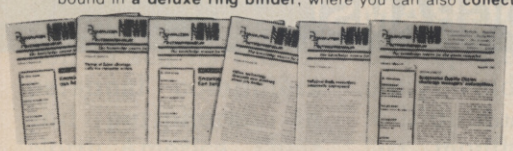
Systems House, Software Author (who to sell to and who to avoid), **Service Bureau, Software Publisher** (How to find programs that sell, **Word Processing Service, Consulting** and **Consultant Broker** (use your skills or those of others, **make** $150 - $1000 **a day!),** The **incredible Games Business, Computer Store** (Franchises: Pro and Contra, or a low inventory store **in your home!), OEM, Hardware Mfg, Data base** and **Teletext Service (big prospects!), Used Computers, Repairs, Rent-A-Computer, Promote Fests** and **Trade Shows, Turnkey Systems, Bartering, Mail Order, Compile and rent mailing lists, Specialized Data Headhunting** and **Temp Help Service, Tech Writer Shop, Custom Engineering,** The **highly profitable Seminars** and **Training Business , and many more!**

Many **new ideas** and **ground floor opportunities! Interviews** and **success stories** on **companies** of **all sizes! Privy info on the profits made:** How some **computer store** operators **net** $100 - $250,000! Little known outfits that made their owners **millionaires,** one of these low-key companies, making simple boards, went from **nil to** $20,000,000 and **100 employees** in **four years!** Programmers that make $300,000, **Thousands** of **micro millionaires** in the making, etc!

Whatever your goal is - **Silicon Valley Tycoon,** or just a **business at home - we guarantee** you'll find a **business** to **suit you - or your money back!**

PART TWO of the manual is **loaded** with the **know-how** and **"streetfighting" savvy** you need, both as a **novice** or business **veteran,** to get started, to stay and to **prosper** in the micro computer business! **A goldmine of information** in clear and easy-to-use instructions: How to prepare your **Business Plan, Outside financing,** The **mistakes** you **must avoid,** How to **hire** and **manage employees, Incorporation** (when, and how to do it **cheaply), Surviving bad times, Record Keeping,** how to **estimate your market before you start,** Use **multiple locations** to **maximize profits,** how to **promote** and **stay** steps **ahead of the competition!** How to get **free advertising, free merchandise, free advice, Power negotiating** with suppliers to **double** your **profit margins, etc!** Even how to **keep a present job while starting a business part time!**

Don't miss this opportunity to be part of this **great industry - the next success story** could be **your own! Order the manual today!** Part one and two, bound in **a deluxe ring binder,** where you can also **collect our newsletter (free for six months with the manual - a** $32.50 **value!) - all for only** $29.95!



THE COMPUTER ENTREPRENEUR NEWSLETTER – ALL THE LATEST INSIDE BUSINESS NEWS! NOW! SIX MONTHS FREE WITH YOUR MANUAL!

You're **always attuned** to the industry, and **your manual kept up-to-date,** with our **newsletter!** Each issue has the **latest business news, ideas, new suppliers,** our **indispensible "watchdog" column** on **profits, discounts** (don't miss mfg's promos, like recently, when top video monitor sold at $80 - that's half wholesale, **one third of the retail price!), the competition, the big deals, etc! Feature stories** with start-up info and case histories **on new micro businesses!**

You'll get **invitations** to trade shows and conventions, the **usage** of our **advisory service** and our **discount buying service** for your purchases!

You'll find **many items** in our newsletter that will **save you the cost of your manual many times over!**

CALL TOLL FREE!
CHARGE IT!
Credit Card Orders
(MC, VISA only)
accepted 24 hours/day
1-800-227-3800
Ask for extension 1135
In California call
1-800-792-0990

MasterCard VISA

Order by phone (Credit cards only), or use the coupon:

Mail to **THE COMPUTER ENTREPRENEUR PUBLISHING CO. PO BOX 456, Grand Central Station, New York, N.Y. 10163**

Please send me **THE COMPUTER ENTREPRENEUR MANUAL,** and the **six month free subscription** to **THE COMPUTER ENTREPRENEUR REPORT/NEWSLETTER. All for only** $29.95, plus $3 for postage/handling **(NY residents:** add $2.64 for sales tax). If I decide not to keep the manual, I may **return** it **within 30 days** for **a full refund.**

NAME: _____

ADDRESS: _____

CITY, STATE, ZIP: _____

☐ Check or M.O. enclosed Charge to ☐ VISA ☐ MC

CARD# _____

Exp. Date: _____

SIGNATURE: _____

B0383

© 1982, THE COMPUTER ENTREPRENEUR

For more information, circle 22 on Reader Service Card.

Roll up for the ZX circus

T/S 1000, ZX81 fairs still popular

EXHIBITIONS have long provided the many suppliers in the British Sinclair market with a popular outlet for their products.

With the majority of sales being conducted through mail order it provides a welcome opportunity for them to find out what their customers are thinking and what their competitors are doing. It also allows the customers to see the products working before they spend their money.

There is a wide range of events from which to choose. They are held at all times of the year and in all parts of the United Kingdom. There are the general shows usually held in London at which the whole range of home computers are on show including the Apples, Vics, Ataris and BBC machines as well as the Sinclairs. They attract crowds in the tens of thousands. The Personal Computer World show held last summer at the Barbican in the City of London attracted 70,000 people over four days.

At the other end of the scale there are the small local shows organized by computer clubs which attract a few thousand.

One of the unique features of the market for Sinclair Research machines in Britain has been the regular ZX Microfairs organized by Mike Johnston. All but one have been held in London and people from all over Britain have made the trip to the capital for the event.

"I became involved with the shows by accident" said Johnston. "At one of the early meetings of the National ZX Users clubs in 1981 some people came along to sell some things. Since this proved very popular, I suggested to the club that the idea be repeated with more exhibitors but they said they were too busy and suggested that I do it."

Mike imagined that the interest would be limited with between 12 and 15 exhibitors attracting about 300 people. He quickly discovered that he had greatly underestimated the interest from suppliers and switched the venue to a much larger hall near the Houses of Parliament.

"I only took half the space that I could have and I was really worried that the 3000 people I expected would be lost," said Johnston.

He need not have worried. About 5,000 people crowded into the hall and he believes that many more were put off by the long lines and the crush in the hall.

A second show was held in January 1982 at which the space for exhibitors was doubled, but the crowd was almost twice that of the first show. People lined up for hours to get in and at one point it went twice round the large hall and a long way down a neighboring street.

Both these events were held in the early days of the Sinclair computers when the amount of the software and hardware available was limited.

Johnston said: "One of the reasons for holding the shows was that the market was still young and there were a lot of exciting things being produced. I wanted to let people see what was happening."

Despite the growth of the shows since those early days he has attempted to keep this one of the main aims by keeping the organization simple and the cost of taking space small.

"I want to keep the prices down so that it encourages the small producer who may still have an interesting product to come along. I know many of the bigger companies make large amounts of money at the shows but they were small at one time. It was only because they were able to show what good products they had that they were able to grow."

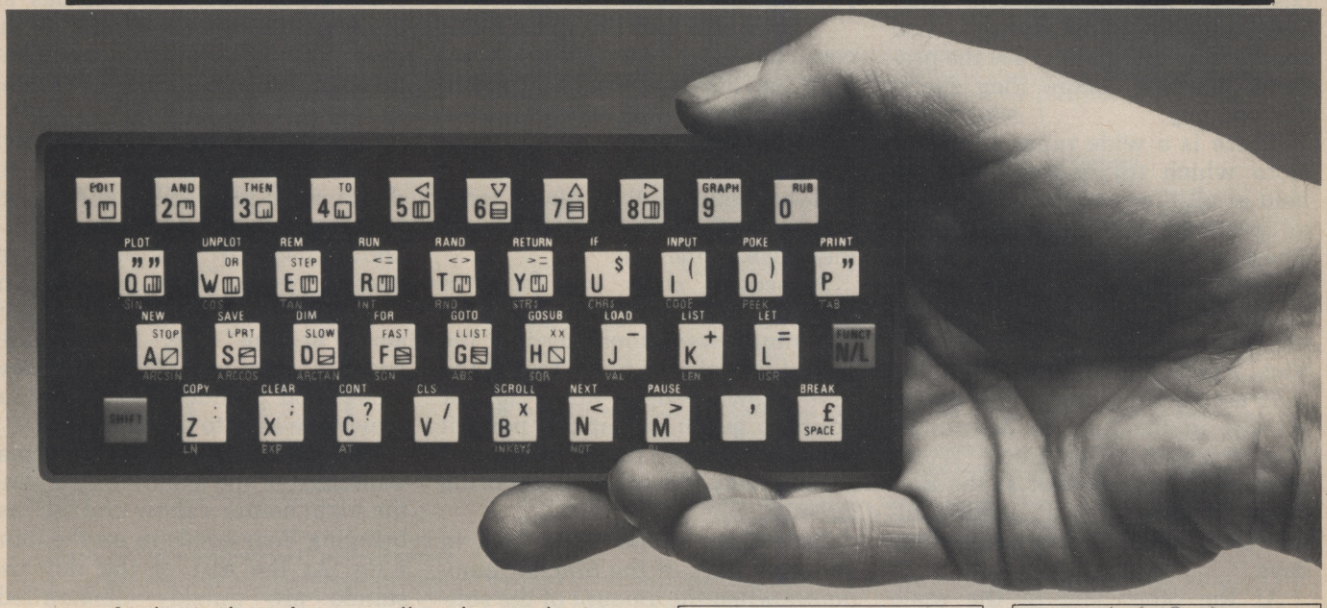
The emphasis is on the informal with most of the exhibitors arriving the night before a show and the rest bringing their goods in on the morning. At the end of the day the stands are quickly dismantled. Johnston estimated that at each of his shows about $200,000 of business is done.

The shows are now so popular that most of the space is sold almost as soon as dates are announced.

The final sign of success is that there are a growing number of people throughout Britain more than willing to follow his example. The same simple formula has proved successful in most of the country's major cities although no one has yet managed to repeat the spectacular results of the shows in London. But they have given the organizers enough encouragement to hold them again.

There are always fears that the Sinclair bubble might burst but it has shown no signs of doing this yet. And America is a new land of opportunity for anyone wishing to do the same sort of thing.

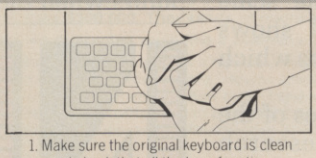
NOW. A TS1000/ZX81 PUSH-BUTTON KEYBOARD FOR UNDER $20.00.



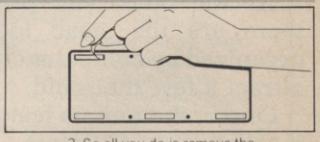
At last there's a really cheap but efficient way of ironing out the TS1000/ZX81's only real bug: its keyboard. The Filesixty Buttonset offers

- A full-travel calculator-type moving keyboard for only $19.50.
- Installed in seconds. The peel off adhesive backing means you just register into position and press.
- No messy labels, dismantling or soldering.
- 3 groups of colour keys to pick out shift, numerals and newline.
- Precision moulded in ABS to match your TS1000/ZX81, with contrasting legends for maximum legibility.

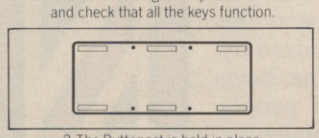
Orders to Filesixty Ltd., 25 Chippenham Mews, London W9 2AN, England. Tel: 01-289 3059. Telex: 268 048 EXTLDN G 4087.



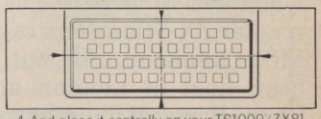
1. Make sure the original keyboard is clean and check that all the keys function.



3. So all you do is remove the protective backing.



2. The Buttonset is held in place by self-adhesive pads.



4. And place it centrally on your TS1000/ZX81.

Cheques/money orders made payable to Filesixty Ltd.

Please send me_____(qty.) Buttonset(s) at $19.50 each (inclusive of postage & packaging).

Total $_____ BLOCK CAPITALS

Name_____

Address_____

_____

State_____

Zip_____ FILESIXTY USA2TSU

For more information, circle 23 on Reader Service Card.

Software

Welcome to TSU's regular software roundup, in which we test and review program products currently on the market. We hope our reviews will help you spend your computer dollars wisely.

Each month TSU's reviewer, will look at a number of programs with some common theme. This month, it's action games: whether the programs on these pages feature hunters chasing rabbits (as in Packrabbit) or aliens firing laser guns at humans (as in Space Raid), they all test your reflexes to varying degrees.

Each program is first described and then evaluated: How well has it achieved its goals? How clear are the instructions? And — most important — how much fun is it to play?

Our rating system is a simple scale of 1 to 10, with 10 being top marks. Let us know if you agree with our ratings!

Fun In The Carrotpatch

Description: In the game called **Packrabbit**, you are a rabbit being chased by four hunters. You must eat all the carrots in a large, complicated maze before you are captured by the hunters. You score one point for each carrot you eat.

Scattered around the maze are magical carrots. When the rabbit eats a magical carrot, the hunters change into a form in which they can be eaten. The rabbit scores ten points for each hunter digested.

There are two holes on each side of the screen. When the rabbit goes into one of these holes, it comes out on the other side of the screen. This is an aid to escape from the four hunters.

The player is given ten lives and a choice of two games, one having more complicated mazes than the other. Each game has three mazes. After eating all the carrots of one maze, the player is immediately placed in another maze.

The game can be played at ten speeds. The novice will like the lower speeds. The rabbit has little hope against the marauding hunters.

Evaluation: We found Packrabbit to be as fast and exciting as the famous arcade maze games. Racing through the mazes is very addictive indeed. The major difference between Packrabbit and other maze games is the greater size and complexity of its mazes. As it is important to conserve the magical carrots until they are most needed, players must carefully plan their routes in advance.

The choice of games and levels of speed allow the player to choose the game most suitable. Having a total of six mazes should maintain the interest of highly skilled players. Packrabbit was designed so that the final mazes are the most difficult.

Packrabbit requires a 16K memory and is distributed by International Publishing and Software. It is probably the most enjoyable and challenging game we have found for the T/S1000,ZX81. For this reason, we have chosen to give this game away, free, to all subscribers to this magazine. We hope you enjoy it as much as we have. (Circle 1 on Reader Inquiry Card.)

TSU Rating: 8.

Flying Your T/S1000

Description: In **Night Gunner**, you are the pilot of an airplane in combat with four enemy planes. At the center of the screen is your firing sight, a cross used for aiming. Using the cursor keys, you maneuver your airplane to get the enemy aircraft within your sights, and then you fire. The object is to destroy the enemy airplanes before they destroy you.

Evaluation: This game is fun. Each time I played, I was shot down without warning after destroying several enemy aircraft. Pointing the sights at the airplane was difficult, and when I did, I was usually too slow in shooting.

Night Gunner is programmed in machine language for fast action. The graphics used for planes aren't great, but recognizable.

Distributed by Softsync, Night Gunner is a refreshing change from the standard shooting games. However, given the choice, I'd rather play one of the more conventional shooting games. Night Gunner requires a 16K memory. (Circle 2 on Reader Inquiry Card.)

TSU Rating: 7.

SPECIAL SUBSCRIPTION OFFER

timex sinclair user

SPECIAL SUBSCRIPTION OFFER

A new and unique magazine for the world's most popular personal computer

TS1000, ZX81
USER GROUP "BONUS BUCKS" OFFER

EARN AT LEAST $125 FOR YOUR GROUP

TAKE THESE FOUR STEPS AND EARN "BONUS BUCKS"

1. **Sign up to 25 members or more as subscribers for Timex Sinclair User magazine, at $29.95 each.**
2. **Send us a check for only $24.95 per order.**
3. **Keep the $5.00 Cash Bonus for each order. (Minimum 25) Earn at least $125 for your group.**
4. Send us the names and addresses of the subscribers.

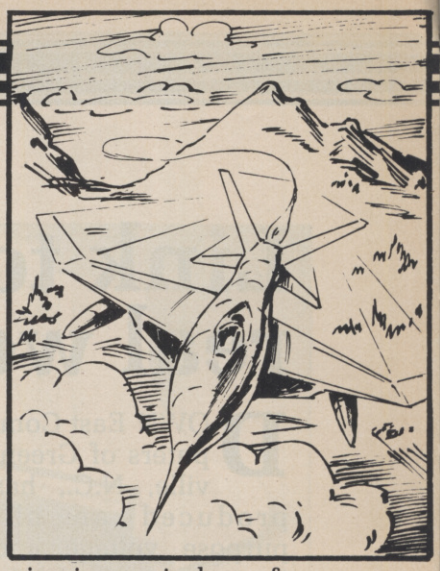
USE YOUR CASH BONUS TO:

* **Pay for your newsletter**
* **Hire speakers for meetings**
* **Purchase machines**
* **Rent meeting halls**
* **Attend conferences**

FREE 'PACK RABBIT'
Retail value $15.00

A good reason to order now! Receive a software program cassette of an exciting, new arcade game! "Packrabbit" is a regular $15.00 retail value. Free with subscriptions for a limited time only.

Software



Points Lost for Program Flaw

Description: By skillfully piloting your ship through space and firing at enemy craft, you must protect your convoy from destruction in **Cosmos.** You must direct your ship near an alien and fire your laser before it gets away. Points are scored by destroying alien ships.

The player is presented with a black screen. The player's ship is a flashing square in the center of the screen. The direction keys scroll the screen in any direction allowing for quick movement through space.

While flying, you must avoid hitting your own convoy and alien space mines. An alien space mine destroys your ship. A player gets three lives for the game.

Cosmos features Mindware's "Quickload" program which they say loads the program four times as fast, it was probably closer to three.

Evaluation: The graphics and speed of Cosmos make it a very good game. The full black screen using periods for stars make a very effective visual. The game is enjoyable and challenging to play.

I found a major bug in the game when I ran into an alien space mine. The screen flashed, signifying I was hit, but the game never resumed.

Without the bug, I would rate the game a nine. The graphics of this game are better than most. Due to the one major flaw, I cannot rate Cosmos favorably. It is distributed by Mindware, and works in 16K. (Circle 3 on Reader Inquiry Card.)

TSU Rating: 4.

Aliens Attack Again

Description: In **Invasion Force**, you control a laser base and must shoot through a moving force field and destroy an alien ship. If you hit a black blob in the moving force field, all your damage to the ship is repaired. Smaller ships fly by and drop bombs on you. The game ends when you run out of laser bases or you run out of time.

Evaluation: This is a fun game to play. The enemy ship is difficult to destroy and the moving force field is an interesting obstacle to shoot through.

The graphics of the game are unusual. The instructions scroll off from left to right after you read them. When the laser base or the alien ship is destroyed, the explosion is shown graphically.

A timer goes from 15,000 to 0. After destroying the ship, the player scores the amount left on the timer. In my best game, I destroyed the ship three times and scored 25,390 points. Can you beat that? Invasion Force requires a 16K memory and is distributed by Reston Publishing. (Circle 4 on Reader Inquiry Card.) TSU Rating: 9.

Happy Simulated Landings

Description: With the **Flight Simulation** program you must land your airplane successfully on the runway without crashing. Sitting in the cockpit, your control panel shows your speed, altitude, fuel and power. The top of the screen is your viewing window for the landing.

The player is given the option of flying just the final approach. Another option is wind effects. If the player chooses to have wind effect, a wind speed is given which makes landing even more difficult.

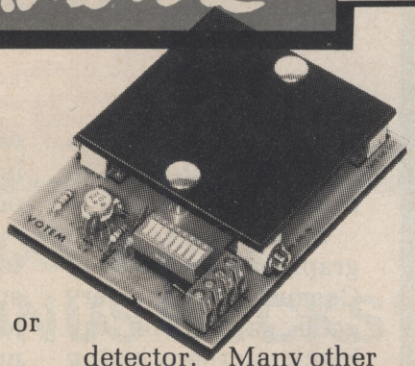
Evaluation: Flight Simulation is an interesting use of the T/S1000,ZX81. This is not a standard game where the player receives a score and has three lives to play. This involves no shooting at enemy aircraft. The player wins by not crashing.

In playing this game, I learned that I should never try flying a real airplane. I crashed every time. Each time I crashed, a message was printed, such as: "You crashed into the ground at a speed of 187 knots."

Flight Simulation is definitely recommended to all amateur pilots. It requires a 16K memory and is distributed by Psion Ltd. (Circle 5 on Reader Inquiry Card.)

TSU Rating: 10.

Link to the real world



DOWN East Computers of Greenville, N.C., has produced an all-purpose voltage and temperature measuring system designed to interface with the T/S1000, ZX81 computer or any Z80 based system. The Votem, as it is called, containing all the necessary hardware and software, is an ideal link between the digital and the real world (analog). It is sold both assembled and in kit form.

For the kit, Down East appears to have spent a considerable effort on component selection to insure a good PC board layout and ease of user connections. The board layout is easy to understand and more important, it allows for easy servicing (should it be needed).

All the parts are labelled directly on the board and correspond neatly with the schematic diagram supplied. The connections are quite accessible for easy assembly. They too are well labelled, which helped us avoid any "fatal" mistakes. To make it even simpler and faster, no soldering connections are made to the board. They are all made via jacks or terminal screws.

The manual is extremely comprehensive and written to be understood. It starts at basic principles and guides the user, step-by-easy-step, through the assembly, operation, calibration and features of the Votem.

Nothing is left to guesswork and the manual tries (successfully, we feel) to insure that the user will not make errors due to any poor explanations. The circuit explanation and the schematic diagram allow you to gain an understanding of the principles of analog interfacing.

The Votem is not geared toward a programmer's use but rather toward the experimenter's enjoyment. Several applications are described in the manual such as a game paddle or a light detector. Many other uses come quickly to mind; photography (temperature and timing), home energy savings (temperature control), light industry (voltage sensing).

Finally, the cassette interface incorporated on the Votem board allows great scope on tone and volume settings. The "audio out" together with the LED indicator let me know that something was actually happening. A Schmitt trigger in this circuit amplifies the loading signal and reduces noise. This allows you to load a program at a lower volume.

The Votem opens up a whole new world (the real world) of applications for the TS1000,ZX81 user. For further information circle number 6 on Reader Service Card.

OUR EVALUATION

TSU rates the Votem in the seven categories listed below. The highest rating is 10, and means excellent; the lowest is 1, and means poor.

Mechanical Construction	8
Ease of operation	9
Reliability	8
Servicing needs	8
Manual	10
Usefulness	7
Appearance	5

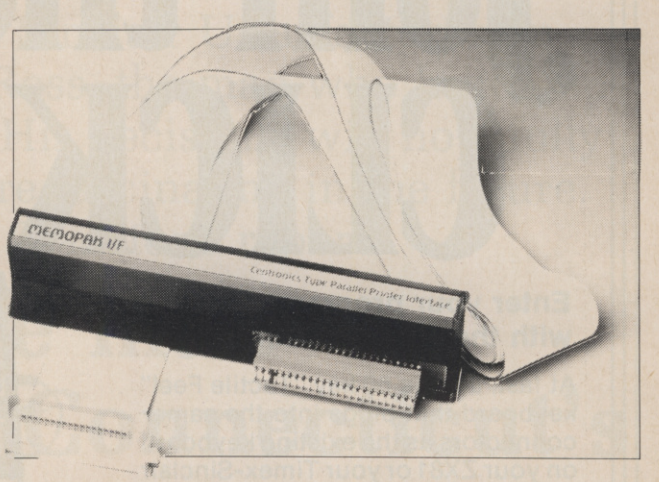
Now your computer talks back

"Good morning! This is your friendly computer talking." Your T/S1000,ZX81 can now say words like that thanks to DCP's speech pack. It fits well onto the back of your computer and adds the excitement of

sound to your programs. It can "say" all the letters of the alphabet, the numbers 0 to over one million, and some standard words. You can make it say new words by plugging additional "wordpack" ROM s into your speech pack. The unit comes complete with a built in amplifier, speaker and volume control. The applications of this unit could be tremendous in preparing material for education, program instructions, and in making games more fun to play. At the rear of the unit is an edge connector to allow other add-ons to be used with it.

For more information, circle reader service number 7 .

Word processing potential



THIS handsomely designed unit, put out by Memotech, allows the user to connect the T/S1000,ZX81 to a "normal" parallel printer. It contains all the software for code conversion to printers such as Epson, Centronics, SCM, and others. All Timex Sinclair printer commands such as COPY, LPRINT, LLIST are supported. All control codes for the printer may be utilized by the interface, and these may be used for document formatting. The computer's normal characters are printed as upper case letters and the inverse characters (graphic) are printed as lower case letters. The graphic symbols may not be printed, but can instead be used as control codes. Now with a good software package the T/S1000,ZX81 can be made to do some small word processing applications.

For more information circle reader service number 8 .

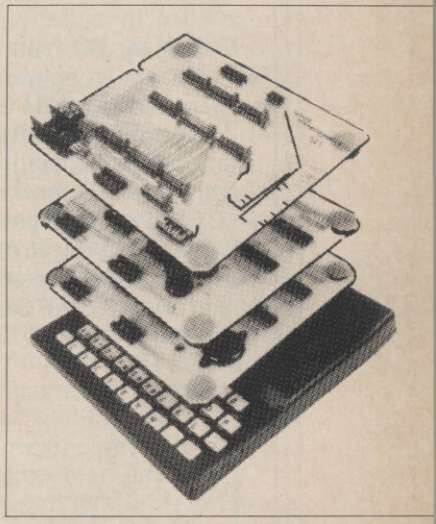
Back-up system for data

THIS unit, called the ZX-99 RS 232C & Tape Control System is designed for the person needing large data-base capabilities. It provides control for four tape recorders (they must have a "remote" plug). It will allow you to save up to 200K bytes on one C-90 cassette tape. Further, it gives you a visual indication of the status of each tape. The system's built-in software program contains many file-handling routines, such as, "Block Skip", "Merge", and "Search". The unit comes equipped with a serial output which follows the standard RS 232C format. Each of the RS 232C functions are controlled by you and you may select any one of eight BAUD rates. Also, you may use any parity and stop-bit configuration.

NOTE: This is only an output and cannot be used with a modem.

For more information, circle reader service number 9 .

Input/Output Board lets you add on peripherals

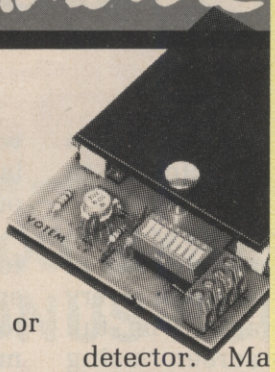


THIS I/O (input/output) board is a must for any hardware oriented T/S1000,ZX81 owner. It lets you add on such peripherals as digital to analog and analog to digital converters. All address and data lines are buffered in order to provide extended drive capabilities. All address lines are decoded for ease of operation and all internal and external memory is inhibited when you select I/O. A rear edge connector allows you to use other add-ons such as a printer or a RAM pack at the same time.

You can add other Microdevelopment peripherals to this board (a "Beeper-Clock" Module or a D/A — A/O converter) or you may custom build your own add-ons.

For more information, circle reader service number 10.

Link to the real world



DOWN East Computers of Greenville, N.C., has produced an all-purpose voltage and temperature measuring system designed to interface with the T/S1000, ZX81 computer or any Z80 based system. The Votem, as it is called, containing all the necessary hardware and software, is an ideal link between the digital and the real world (analog). It is sold both assembled and in kit form.

For the kit, Down East appears to have spent a considerable effort on component selection to insure a good PC board layout and ease of user connections. The board layout is easy to understand and more important, it allows for easy servicing (should it be needed).

All the parts are labelled directly on the board and correspond neatly with the schematic diagram supplied. The connections are quite accessible for easy assembly. They too are well labelled, which helped us avoid any "fatal" mistakes. To make it even simpler and faster, no soldering connections are made to the board. They are all made via jacks or terminal screws.

The manual is extremely comprehensive and written to be understood. It starts at basic principles and guides the user, step-by-easy-step, through the assembly, operation, calibration and features of the Votem.

Nothing is left to guesswork and the manual tries (successfully, we feel) to insure that the user will not make errors due to any poor explanations. The circuit explanation and the schematic diagram allow you to gain an understanding of the principles of analog interfacing.

The Votem is not geared toward a programmer's use but rather toward the experimenter's enjoyment. Several applications are described in the manual such as a game paddle or a light detector. Ma
uses come qu
mind; photo
(temperature a
ing), home ene
ings (temperat
trol), light i
(voltage sensir

Finally, the
interface inco
on the Voten
allows great s
tone and volu
tings. The "au
together with
indicator let n
that something
tually happer
Schmitt trigge
circuit ampli
loading sign
reduces nois
allows you to
program at a
volume.

The Votem opens up a whole new world (the real world) of applications for the TS1000,ZX81 user. For further information circle number 6 on Reader Service Card.

OUR EVALUATION

TSU rates the Votem in the seven categories listed below. The highest rating is 10, and means excellent; the lowest is 1, and means poor.

Mechanical Construction	8
Ease of operation	9
Reliability	8
Servicing needs	8
Manual	10
Usefulness	7
Appearance	5

it say new words by plugging additional "wordpack" ROM s into your speech pack. The unit comes complete with a built in amplifier, speaker and volume control. The applications of this unit could be tremendous in preparing material for education, program instructions, and in making games more fun to play. At the rear of the unit is an edge connector to allow other add-ons to be used with it.

For more information, circle reader service number 7 .

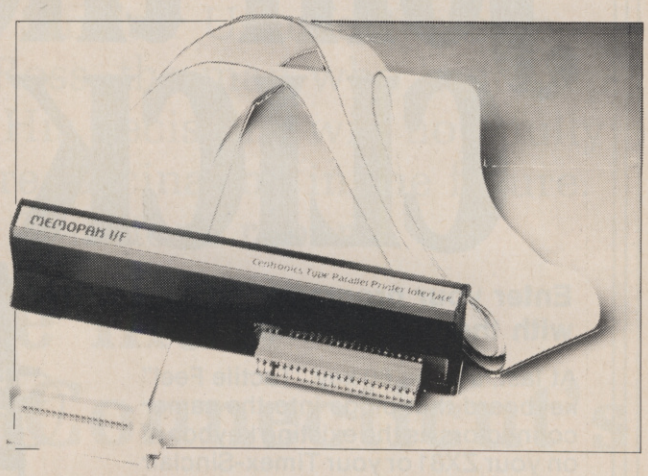
FREE

Tear This Card Out and Fill It In Now
Name _____
Address _____
City _____ State ___ Zip ___
Interests: ☐ Memory ☐ Printer/Printer Interfaces ☐ Modem ☐ Keyboards
☐ Expander Boards ☐ Disk ☐CP/M ☐ BASIC ☐ Machine Language
☐ Hardware Construction ☐ Games ☐ Utilities ☐ Applications ☐ Book Reviews
I Program At ☐ Beginner ☐ Intermediate ☐ Advanced
and Build At ☐ Novice ☐ Advanced ☐ Expert Level
Place in Envelope and Mail To: The Harvard Group
Dept. ZX/TS, RD2, BX457, Harvard, MA 01451
We'll send you our list of user groups in your area
TSU1

FREE

FREE

such as COPY, T, LLIST are ted. All control for the printer e utilized by the ce, and these e used for docu- formatting. The ıter's normal ters are printed ber case letters the inverse ters (graphic) inted as lower letters. The c symbols may printed, but can l be used as con- des. Now with a



good software package the T/S1000,ZX81 can be made to do some small word processing applications.

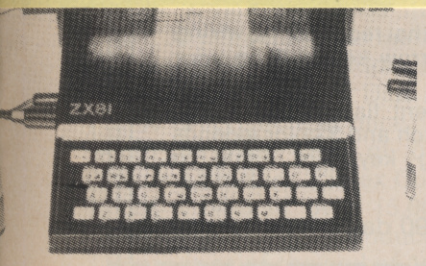
For more information circle reader service number 8 .

or data

cassette tape. r, it gives you a indication of the of each tape. ystem's built-in re program con- many file- ing routines, such as, "Block Skip", "Merge", and "Search". The unit comes equipped with a serial output which follows the standard RS 232C format. Each of the RS 232C functions are controlled by you and you may select any one of eight BAUD rates. Also, you may use any parity and stop-bit configuration.

NOTE: This is only an output and cannot be used with a modem.

For more information, circle reader service number 9.

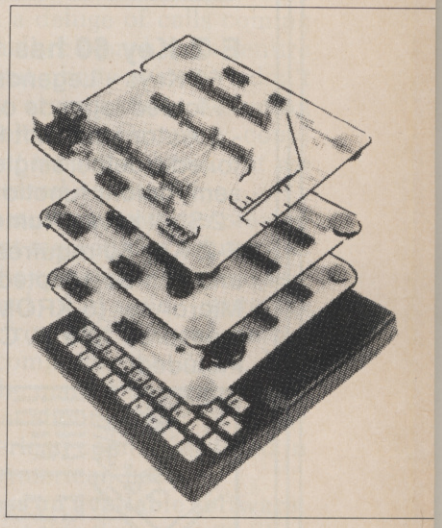


THIS unit, called the ZX-99 RS 232C & Tape Control System is designed for the person needing large data-base capabilities. It provides control for four tape recorders (they must have a "remote" plug). It will allow you to save up to 200K bytes on one

Input/Output Board lets you add on peripherals

THIS I/O (input/output) board is a must for any hardware oriented T/S1000,ZX81 owner. It lets you add on such peripherals as digital to analog and analog to digital converters. All address and data lines are buffered in order to provide extended drive capabilities. All address lines are decoded for ease of operation and all internal and external memory is inhibited when you select I/O. A rear edge connector allows you to use other add-ons such as a printer or a RAM pack at the same time.

You can add other Microdevelopment



peripherals to this board (a "Beeper-Clock" Module or a D/A — A/O converter) or you may custom build your own add-ons.

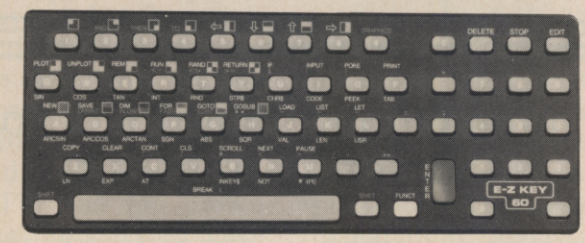
For more information, circle reader service number 10.

Join the CLICK!

Enter your programs Faster & Easier with the E-Z Keyboard . . .

At last, a large 60 key "Tactile Feel" keyboard that plugs into the same connectors as the existing keyboard on your ZX81 or your Timex-Sinclair 1000.

Hear the CLICK and feel a SNAP for every key pressed! (Tactile Feedback).



Only

$84.95

A custom made enclosure (shown above) is also available for your computer and E-Z Key 60 keyboard.

Measurements:	Price:
EC-11 11"x9"x3"	$25.00
EC-14 14"x9"x3"	$30.00

WATCH FOR THESE NEW PRODUCTS!

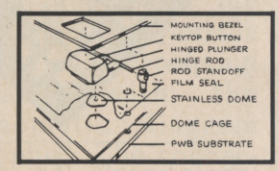
JOYSTICK: Joystick kit that requires no wiring and will fuction like the arrow keys & Ø on your computer.

E-Z Key 40 Replacement flat keyboard with embosing around each switch and 3 color legends and graphics as existing keyboard (plug in replacement).

E-Z Key 60 has the following features:

- 60 Keys - Legends in 3 colors on the base
- Molded legends on key tops
- 8 Automatic shift keys (no shifting required) for edit, delite, single and double quotes,colon, semi-colon, function and stop.
- 2 Shift keys - **Numeric key pad** - 5" space bar.

E-Z Key 60 requires no wiring (just plug it in) and can be adapted to fit the XZ80 or the MicroAce (8 KROM). The Mounting base measures 10"x4". Cables and instructions are included.



SWITCH SPECIFICATIONS:

Key tops measure .4" x .3" - spaced at ¾" intervals between keys. Life = 10 million operations, typical. Force = 3. oz. Travel = .040". Dome switch, button type with arm to give .040" travel.

90 day warranty

USE THIS ORDER FORM...

☐ Check or Money Order

Charge to my: ☐ Visa ☐ Mastercard

Card # _____

Expires _____

	Quantity	Unit Price	Total
E-Z Key 60		$84.95	
EC-11/14		$25/$30	
Total units S&H $4 per unit			
Mass, res. add 5% sales tax			
Total			

Send to:

E-Z KEY
Suite 75 A
711 Southern Artery
Quincy, MA 02169

Signature _____

Name _____

Address _____

City _____ State _____ Zip _____

E-Z KEY

SUITE 75 A, 711 SOUTHERN ARTERY
QUINCY, MASSACHUSETTS 02169
(617) 773-1187

For more information, circle 25 on Reader Service Card.

Interview

In our premier issue, Timex Sinclair User features an exclusive interview with Dan Ross, the man who heads up the Timex computer division. His decisions will hopefully make T/S computing ever more fascinating in the future. Managing Editor Joe Gladstone reports.

Meet the man who clogged up Connecticut's phone system

PROBABLY the man most difficult to reach in the computer business is Dan Ross, Chief Operating Officer of Timex Computer Corporation. Sinclair Research in the U.K. brought out the hardware and Timex added the marketing skills. Together they produced the Timex Sinclair 1000 computer. It entered the marketplace last summer and by the end of 1982 was a major force, according to industrial sources. Timex sold more than 600,000 units, which translates into more than 30 per cent of the market. This tremendous penetration into the market place means Dan is trying to be everywhere at once.

In its first year of operation under Dan Ross, Timex Computers built a base of over 15,000 retail outlets for their products. This figure is as of the end of 1982.

"We're expanding our base and we're also entering new markets that we didn't specifically go after last year" Dan says. "In addition, we're moving off geographically into some new markets. We're planning a launch in Europe in 1983."

Many of those 600,000 new computer owners have expressed frustration in trying to get through to Timex to ask about the problems they have encountered with their machines. Many of those 600,000 new computer owners were first-time computer buyers and expected some back up from Timex. How did Timex respond to their legitimate needs?

> . . . the T/S1000 is now part of the Smithsonian's permanent collection

Ross: bringing new products.

"Well, it's certainly something we're trying to address." Ross said. "We try to be responsive to any correspondence; we opened the 1-800-24 TIMEX telephone number to allow people to call in, and we've staffed it. I know initially last year when we started that number, there was such a deluge of calls coming in, it virtually clogged up the entire Connecticut phone system. I don't think any organization, including the Bell Telephone Company, could handle that type of volume, but we have increased our staff."

The mass of new owners created an "instant market" for software to put into the computer. There was a great deal of good material available from the U.K. where the original computer, the ZX81, had been on the market for over a year.

But what about in the U.S.? How were American companies fitted in to fill an American need?

Dan Ross on available software: "We have at this time over 70 titles that are available with our label on it, and of course there are literally hundreds of other titles that a user can buy. The other sources that we get software from are houses that we contract to develop specific software for us as well as our own internally developed software."

The questions that is on the lips of the nation are, 'When will the

T/S2000 be on sale in North America?' And secondly 'Why is it so different from the Spectrum in the U.K. that the Spectrum software is incompatible?'

Dan Ross on the T/S2000 line: "It will be out about mid-year. The 16K version will sell for $144.95, the 48K for $199.95.

"We have headed the design objective to make the product as compatible as possible to the Spectrum, but we wanted to add features to it that we felt were essential to our market. Specifically, we enhanced the product to accept solid-base software."

Beyond software, Dan specifically talked about users' groups. He felt they were a major way in which novice or expert computer users could get much more from their machine.

"Quite frankly, they're quite a resource for us.

"We're setting up user groups. These have come on-stream slower than we had hoped, but we're setting up user groups throughout the country.

"I've spoken at a number of meetings myself personally to reflect our support of what they're doing. We don't want to control these, but we certainly want to be involved."

Ross seemed also exceptionally interested in establishing the T/S1000 as a valuable tool in the education market. He felt the Timex Sinclair computer was especially suited to schools. It is light, inexpensive, easy to use, and a good tool to use to introduce programming to children.

Dan Ross on education: "We're really excited about this market because it relates to our products. Computers in the classroom, computer literacy is something we're certainly committed to. Our product is very well suited for use in education.

"We recently launched a program in the state of Connecticut. This program is unique in that it is a curriculum-first, teacher training, as well as the classroom training for the student. It's software, courseware, literature, as well as the hardware. Our product is targeted more to computer literacy than, say, the computerized system of instruction. But this is a program that we have developed in conjunction with some of the leading educators in the country. Specifically, we've been working with some of the educators of Villanova University.

"I think it'll certainly aid in our objective of providing computer literacy to the masses."

The next question was about the new machine everyone is buzzing about, the T/S1500.

> "Certainly we endorse . . . magazines about our product."

"We haven't announced any product like that," Dan said.

Well, that may be Dan, but in our news report we do have some "unofficial" information about that "non" machine.

Dan allowed that Timex and Sinclair were still actively working together to bring new products to the U.S. When asked about the much-publicized Sinclair flat screen monitor, he replied, "I'd prefer to let him (Clive Sinclair) speak to you on that particular device." Then what products can we expect soon?

Dan Ross on the new products: "The printer was launched a couple of weeks ago at major department stores. We're developing a MODEM for the 1000 and the 2000. In addition, we're moving off geographically into some new markets. We're planning to launch a program in Europe in 1983 in conjunction with Sinclair."

This magazine is a new product. While not connected to Timex Computers, we certainly are heavily involved with them and their related products. Have you any kind words to say about us?

"Certainly we endorse having people put together magazines about our product. I think it offers our users a range of documents that they can go to to get information, to find out about new products, to find out and continue to build that interest that you alluded to in our products."

Dan seems to be very sincere when he expresses concern that those people who want an inexpensive computer to join the computer age deserve the best available.

Dan Ross on personal computers: "We are committed to making sure that we are the price-value leaders in our particular segment. I think that we're going to continue to try to bring the best price-performance, price-value computers to the market place."

Dan Ross on Dan Ross: "I'm from Atlanta. I went to school in Louisiana. My background is math and computer science from Louisiana Tech.

"I've been in data processing now for 17 years, at IBM mainly in the mainframe area. My career has spanned IBM, Itel Corp., and Memorex. I was brought on board (hired by Timex) actually about a year ago to start the Timex Computer Corporation. It's been a wild ride since."

Starting with the T/S1000, Dan Ross with Timex made history. It was the first computer in the United States to retail for under $100.00. To honor this fact, the Smithsonian Institute has selected the T/S1000 for its permanent collection. Dan Ross made the formal presentation in Washington, D.C.

On March 15, an ad in the Wall Street Journal showed the T/S1000 for sale for $49.95. From under $100.00 to under $50.00 in 7 months . . . . not bad, Dan Ross, not bad, but what's left to do?

"I think we've just scratched the surface. I think it's vastly important that people become involved with computers. Our product is especially suited to provide them their first step into computers, to learn about what computers are all about, and I think the market will continue to explode as it did in 1982 for the rest of this decade."

INTERCOMPUTER INC.
T.M.

Expands the use of your TIMEX SINCLAIR 1000

INTERCONTROLLER™
Makes Your Life a Little Easier

Puts your Timex Sinclair 1000 to work around the clock and does any number of tasks for you automatically (turns on/off your lights, motors, waters your lawn . . .). Just plug INTERCONTROLLER™ into your computer and program each of the unit three switches individually. The INTERCONTROLLER™ is software programable time intervals from fractions of seconds to days. You can connect up to four INTERCONTROLLER™ units to your computer if you have a SOFTBOX™.

#PL7013 $34.95

CARTRIDGES
Don't Wait For Cassette Based Programs To Load

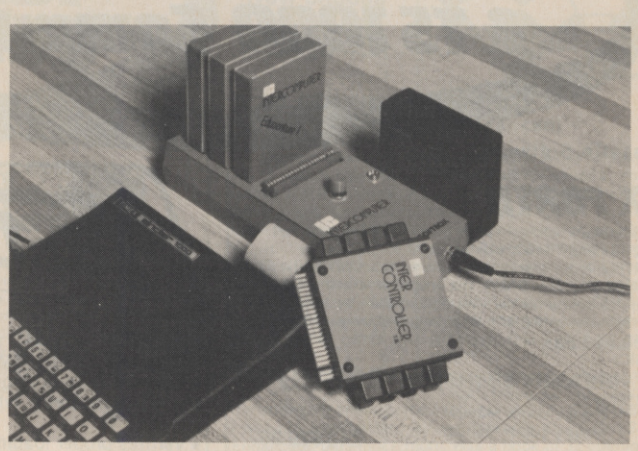
Many intercomputer programs are also available on solid state cartridges. Just plug a cartridge directly into your TS 1000 or if you have a SOFTBOX™, connect up to four cartridges to your computer at a time and enjoy having instant and easy access to your favorite program.

#CS1001 $24.95

SOFTBOX™

This modular box contains four gold plated, software selectable connectors which can hold any combination of INTERCONTROLLER™ units or software CARTRIDGES. The SOFTBOX™ has a DC power input jack, an on-off switch, and an LED indicator, providing a better alternative for powering on/off your computer and peripherals eliminating overloading problems.

#PL7012 $59.95



QSAVE
A Reliable Fast Loading System

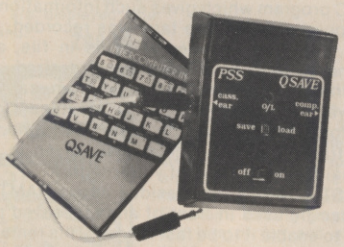
Many thousands of satisfied customers now have a highly reliable loading system which operates 16 times faster than the Sinclair system. This is what you get:

1. A cassette interface to improve the signal quality (essential if a high speed loader is to be reliable) which will also improve the loading of your programs. The interface plugs into your Timex Sinclair 1000 using the leads supplied and has been improved to incorporate: AN AUTOMATIC LEVEL CONTROL . . . AN OVERLOAD WARNING LIGHT . . . A SAVE/LOAD SWITCH (no unplugging of mic or earphone leads) . . . AN ON/OFF SWITCH (which doubles as a Reset switch). With these features loading is highly reliable (programs will still load with a volume setting as LOW as ¼).
2. Highly sophisticated software which will load and Save programs at 16 times their normal speed (i.e. 8K in 10 secs; 48K in 110 secs). Programs can be named to allow a superfast file search through a tape. It works equally well with autorun programs, Basic or machine code. A TRUE verify feature is also provided — this allows you to verify that a 'SAVE'd program has 'SAVE'd properly BEFORE turning off the power and finding all is lost.

QSAVE will operate with ANY memory, on ANY program length AND with your existing programs.

All the above is contained in ½K of superbly easy to use Software.

#PL7001 $37.95



MCODER
Makes Machine Code Redundant

Now there is no need to spend long tedious hours writing and debugging your programs in laborious machine code — let MCoder do all the hard work for you . . . .

MCoder is the first real integer compiler for the Timex Sinclair 1000. This very sophisticated piece of software will simply translate basic programs into machine code for you, giving an average speed improvement of the order of 75 times although in certain cases the improvement can be as much as 900 times faster.

MCODER IS DESIGNED TO BE AS SIMPLE AS POSSIBLE TO USE . . . .

1. Load MCoder
2. Write or load your basic program as normal
3. RUN and debug your basic program
4. Compile your program using a single PRINT USR command. If you have made a mistake MCoder will tell you exactly where, allowing you to correct it before it is too late.

As an additional feature basic programs can be compiled and "Stacked" above each other in memory — giving you true flexibility in your programming.

#PT4001 $18.95

STOPPER

No doubt you have felt the frustration of not being able to see the listing or to make backup copies of machine code programs. Intercomputer STOPPER ends this frustration and enables you to break through any machine code software you want, list the program on the screen, save it on another tape, or print it if you have a printer. Simply load STOPPER and your program into your TS 1000 and follow instructions. Once loaded STOPPER stays in your computer and you may use it for other programs. **#PT4002 $18.95**

Mail to: Intercomputer, Inc., P.O. Box 90
Prudential Center, Boston, MA 02199
Tel: (617) 437-1190
Telex: 951141COFAR

PART #	QTY.	UNIT U.S.$	TOTAL
Shipping and Handling		4.95	
Mass. Residents Tax		5%	
☐ Check ☐ Mastercard ☐ Visa		**Total**	

Account No. _____ Exp. ____

Name

Address

City State Zip

COMING SOON: A full line of Software and Peripherals for ZX SPECTRUM/TIMEX SINCLAIR 2000

Get serious about ZX81 & TS1000 Computing

Cassette Software

ZX FORTH

A complete implementation of the FORTH language for the ZX81 and TS1000 computer.
FORTH's most distinctive feature is its flexibility. The basic unit is the word — the programmer uses existing words to define his own which can then be used in further definitions. FORTH is a compiled language so programs run very fast (typically five times faster than BASIC).
ZX-FORTH is supplied on cassette and is accompanied by extensive documentation:
56-page Users Manual
8-page Editor Manual

Z43 $29.95

ZX BUG

Machine Code Monitor and Disassembler
ZXBUG is a powerful tool for machine language programming. It is 4K long and uses memory from 71EO to the top memory. ZX BUG works in hexadecimal (base 16), not decimal, so all addresses are a maximum of 4 Hex bits long. Provides a total of 28 commands.

Z41 $14.95

ZX Assembler

This Machine Code program occupies 7K of memory and locates itself at the top of memory. The program is a full Editor/Assembler and Monitor. Labels may be used instead of any string. The features include Line Insertion/Delete, Insert Characters, Auto Repeat on all keys. The monitor has facilities to inspect memory, registers and run machine code programs.

Z40 $14.95

TOOLKIT 9 Powerful New Functions!

RENUMBER. This routine renumbers a program in any step and from any line up to 9999.
DELETE. This command deletes a group of lines in a program.
MEMORY. Prints how much spare memory is available.
DUMP. Displays current values of string and numerical values, except arrays.
FIND. Will find any string of up to 255 characters and list each line containing that string.
REPLACE. Replaces any string of up to 255 characters by any other string.
SAVE. Transfers program in computer to below RAMTOP.
APPEND. Allows two programs to be joined.
REMKILL. Removes all REM statements from a program, otherwise leaving it unchanged, preserving memory.

Z42 $14.95

Z-AID 1.0

Includes the following routines:
VERIFY confirms whether a program has been recorded properly on tape. The program in memory is unaffected, and a further "save" can be made if necessary.
Mload/Msave enables a specified block of memory to be saved. VPTR can be used within a BASIC program to eliminate many tedious POKEs and PEEKs in finding the addresses where variable values are stored.
CHAIN allows the second part of a BASIC program to be loaded and tacked onto the end of the first part.
Z-AID 1.0 is convenient to use, being loaded from tape, and residing at the top of 16K memory. The user accesses the various routines with USR calls while loading, running, editing and saving BASIC programs normally.

Z98 $14.95

ZX/TS fastload™

Z61 $19.95

- ★ Allows you to LOAD and SAVE ZX81 programs up to 6 TIMES FASTER!
- ★ Easy-to-use in your own programs.
- ★ User-transparent when incorporated into programs.
- ★ Verifies proper loading.
- ★ Catalogue feature lists program names and memory usage.
- ★ LOADER occupies less than 500 bytes (½ K) of RAM.
- ★ Consists of 2 separate programs — KEYBOARD MONITOR and FAST LOADER.
- ★ Supplied on cassette with extensive documentation.

KEYBOARD MONITOR is a user-friendly BASIC program which gives such information as the speed at which the tape was recorded, file name, file type, number of bytes in file, and whether a read error occured. If desired, the user-friendly portion of the program can be removed for direct access to Machine Code Monitor. Both parts reside at RAMTOP and are user transparent. Full details are given in the manual for fast saving of your program.

FAST LOADER also resides above RAMTOP and can be used in front of any fast-saved program to enable it to be fast-loaded. This removes the need to load the monitor for each load.
Reliability and compatability: Fast-Load is an exceptionally reliable system. In one 3 hour test, over 1,300,000 bytes of data were recorded and then read without error, using a low cost cassette player. Compatible with all ZX81 systems, at your choice of two operating speeds: Medium Speed (4 times faster) suitable for use with any tape recorder that works with ZX81; Fast speed (6 times faster) for most higher quality tape recorders.

The Complete ZX81 and TS1000 Library!

BOOKS

The Complete ZX81 Basic Course Includes Basic Course Cassettes (2)	B70 $29.95
Getting Acquainted with your ZX81	C70 $8.95
ZX81 Pocket Book	P70 $10.95
Making the Most of Your ZX81	P71 $10.95
Computer for Kids, ZX81 Edition	C71 $4.95
Explorers Guide to the ZX81	T70 $12.95
ZX81 Companion	C72 $8.95
49 Exploding Games for the ZX81	P72 $10.95
Not Only 30 Programs for ZX81 : 1K	B72 $9.95
Machine Language Made Simple	B73 $14.95
Mastering Machine Code on your ZX81	P73 $12.95
ZX81 Rom Disassembly: Part A	Both for
ZX81 Rom Disassembly: Part B	$19.95
Understanding your ZX81 ROM	B76 $14.95

CALL OR WRITE FOR FREE CATALOG

KEYBOARD $99.95

with metal case K71

A full-sized professional keyboard for the ZX81 Features 47 keys and a full-sized space bar. Connects to the ZX81 with no soldering required, via a plug-in flexible connector. You can purchase the keyboard only, or the optional metal case that holds both keyboard and ZX81. Expansion devices (i.e. RAM packs, etc) connect to the ZX81 edge-connector which extends from the rear of the cabinet.
A professional keyboard makes program entry easier and less error-prone.

Keyboard K70 $79.95
Metal case for keyboard and ZX81 E70 $25.00

GLADSTONE 16K RAM

Equivalent in performance to Times Sinclair RAM.
G16 $149.95

64K RAM

Expands the capacity of the T/S 1000 or ZX81 to its maximum. User transparent. **G64 $149.95**

Coming soon: **32K RAM** PIGGY-BACK
Can be used as a stand-along memory, or in conjunction with 16K (Timex Sinclair, Gladstone, or any other) to give a total memory of 48K. **G32 $99.95**

MEMORIES

CRAMIC-81 16K CMOS RAM

NEW RAM PACK STORES 16K EVEN WITH POWER SWITCHED OFF
CRAMIC-81 is a 16K RAM pack using CMOS technology for permanent data retention. Data can be stored almost indefinitely and loaded almost instantly with virtually zero chance of erro.

CRAMIC-81 module uses chips made in a special CMOS technology which require only a tiny amount of power to retain data when not actually in operation. A state-of-the-art, long life (10 years) lithium battery supplies this power in the standby mode. In the active mode, power is taken from the ZX81. Used on its own it behaves like an ordinary Rampack EXCEPT that it can be powered down and removed. Program and data in it is permanently stored when this is done.

An ordinary Rampack can also be connected simultaneously. The two RAM units then occupy the same memory area but either can be selected. Two separate programs can actualy run alternately.

CRAMIC-81 comes in an elegantly molded lie-flat case with a cabled connector.

C12 $179.95

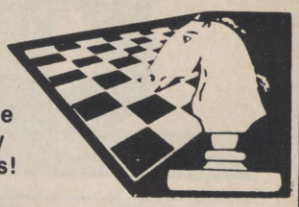
GLADSTONE ELECTRONICS

In N.Y. (716) 874-5510
Toll free (800) 833-8400

Mail order to 1585 Kenmore Ave. Buffalo N.Y. 14217 Checks or money orders. No CODs. Add shipping

GLADSTONE ELECTRONICS GLADSTONE ELECTRONICS GLADSTONE ELECTRONICS GLADSTONE ELECTRONICS GLADSTONE ELECTRONICS GLADSTONE ELECTRONICS GLADSTONE ELECTRONICS GLADSTONE ELECTRONICS

Have fun with ZX81 & TS 1000 Computing



Now choose from many great games!

TS1000-ZX81 OWNERS WIN $20,000

ENTER THE ULTIMATE ADVENTURE

Z48 $19.95

KRAKIT™ consists of 12 clues on a ready-to-run ZX81 or TS 1000 cassette tape (16k RAM). The answer to each clue is the name of a country, a city or town, and a number. If you are the first qualified entrant to solve all 12 clues and declared the winner, you receive two tickets to the city of the secret KRAKIT™ vault location. When you arrive at that location, a cheque for a minimum amount of $20,000.00 (U.S.) will be presented to you. The amount of the prize money is augmented weekly.

BUSINESS Pack 1

Contains 2 tapes with an instruction/applications manual with the following programs:

BREAK EVEN ANALYSIS: Enter expense items by name. Enter revenue items by name. Enter fixed costs and variable costs. Calculate break even point and plot expense and revenue curves. Backward calculation by setting breakeven point quantity, expense or revenue.

CASH FLOW ANALYSIS: Enter income and expense items. Calculate net income. Calculate discounted cash flow — PV and NPV. Plot NPV for various interest rates.

PAYBACK ANALYSIS: Enter expense and revenue items. Calculate years to payback.

INTERNAL RATE OF RETURN: Enter expense and revenue items. Display net cash flow. Calculate IRR.

DEPRECIATION ANALYSIS: Enter depreciable amount. Select depreciation method and enter parameters. Calculate depreciation by any currently allowed method.

Z49 $29.95

Pack II

PROJECT SCHEDULER: Record project est. hours, hours to date, remaining hours. Record billing rate, employees involved. Display amount billed, current billing, estimated billing remaining.

PROPOSAL SHEET: Record work items and hours. Record hourly billing rates. Display overheads, material cost and labor totals.

Z50 $ 14.95

CANADA: PRICES MAY VARY

TIMEX SINCLAIR USER

GAMES

Pilot your space craft through a fast moving, complex space maze. Watch out for missiles being fired from all directions. You can shoot back or evade them. Written in machine code for fast-paced excitement.

Z90 $14.95

Blackjack at its best. Blackjack as it played in the casinos of Nevada. Up to five players can play against a dealer with a fifty-two card deck. Split pairs, double down, and even buy insurance. The deck is reshuffled only when needed — allows for a continuous game. Your winnings and losings are displayed after each hand.

Z88 $9.95

Here is your chance to beat the 'one-arm bandits'. Slotslets you choose 5¢, 10¢, 25¢, 50¢ and even $1.00 machine. Each machine has six sets of different graphics and pay according to the number of coins you played. Excellent, striking graphics, and lots of fun and excitment.

Z89 $9.95

GALAXY INVADERS

An excellent version of the classic space game. Protect your seven lives against fleets of hostile invaders, who swoop down and attack quickly. This version is an excellent demonstration of the capabilities of the ZX81 or TS1000 to entertain and excite for hours.

Z91 $14.95

ZX CHESS (Enhanced)

Full graphic display of chess board. Six levels of play, two of which play within competitive time limits. You choose black or white. Plays all legal moves including castling and en-passant. You can save games in progress on cassette. Displays moves of game on screen, or output yo printer, for analysis. Board can be set up in any position, you can even change sides mid-game. Clear entire board with one command: for end game analysis. Written totally in machine code, ZX CHESS (Enhanced) is a superb game for the advanced chess player.

Z85 $14.95

ZX CHESS II (CHESS MASTER)

The strongest chess game available on ZX81. ZXCHESS II has not ben beaten. All the features of ZX CHESS (Enhanced), plus much more. Has a book of 32 opening moves. Can play at 7 levels, four of which play within competition time limits. A move is suggested by the ZX81 if requested.

Z86 $24.95

1K ZX CHESS

A good introduction to chess for 1K ZX81/TS1000 owners. Even within this limited memory space, a full graphic representation of the chess board is included. Single level of play. Does not accept castling or en-passant moves.

Z87 $9.95

2K Chess (T/S 1000)

(for unexpanded T/S 1000) Improved Chess game for an unexpanded T/S 1000. Better graphics and a vastly superior range of moves.

Z55 $14.95

Your ZX81 becomes the command console as a diver descends to the sunken submarine Nautius to rescue as many of the stranded crew as possible. It's a race against time as your oxygen supply must be replenished. It's also a constant battle against marauding sharks which you can attempt to blast with your laser.

Z96 $9.95

'ZX-Galaxians is a good adaption to the ZX81 of the popular arcade game of the same name. You are being attacked in deep space by formations of hostile Galaxians, and it is your mission to prevent them from attacking Earth by zapping them with your laser gun as they break out of formation and hurtle towards you.

Z72 $ 14.95

GLADSTONE ELECTRONICS

ORDER FORM

In N.Y. Call (716) 874-5510 Toll Free (800) 833-8400

CHARGE TO: ☐ VISA ☐ MASTERCARD

account number

Expiry date

Signature

Date

Please rush me:

Quantity	Price	Total

NAME _____ New York Res. add sales tax ____

ADDRESS _____ SHIPPING ____

CITY: _____ STATE: _____ ZIP: _____ TOTAL ____

To: Gladstone Electronics, 1585 Kenmore Ave., Buffalo N.Y. 14217

Call or write for free TS1000 & ZX81 catalog SY283

GLADSTONE ELECTRONICS GLADSTONE ELECTRONICS GLADSTONE ELECTRONICS GLADSTONE ELECTRONICS GLADSTONE ELECTRONICS GLADSTONE ELECTRONICS

dk'tronics

ZX KEYBOARD FOR USE WITH 80/81 SPECTRUM

Our new cased keyboard has 52 keys, 12 of these are used for the numeric pad. The numeric pad offers some useful features, you can cursor with one hand and it will be a boon for anyone who enters a lot of numeric data. The pad is a repeat of the 1-9 keys plus it has a full stop and a shift key. The numeric pad keys are coloured in red, the normal keyboard keys are grey, with the case being black which makes the whole thing very attractive. The case measures 15 x 9 x 2½. The computer (either 80/81 or spectrum) fits neatly inside. You will have to remove the computer from its original case, it is then screwed to the base of the case. The case had all the bosses already fitted and the screw holes are marked. Also fitted inside the case is a mother board (81 model only) which allows 16K, 32K and 64K to be fitted in the case. All the connections are at the rear of the case i.e. Power, Mic, Ear, T.V. and the expansion port. The case is large enough for other add ons also to be fitted inside. One of these could be the power supply, then you could very quickly fit a mains switch, or a switch on the 9V line. This means you have a very smart self-contained unit. This case does not stop you from using any other add-ons that you may have e.g. Printer etc. We are convinced that this is the best keyboard available at present. It offers more keys and features than any other keyboard in its price range.

$81.00

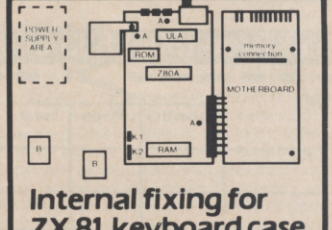
KEYBOARD (SPECTRUM/81)

NOTE

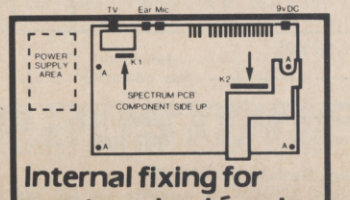
The case can be purchased separately with the keyboard aperture uncut, so if you have one of our early uncased keyboards, or in fact any other suppliers' keyboards, these could be fitted. The keyboard is connected to your computer by a ribbon cable and this has connectors fitted which simply push into the Sinclair connectors. It is a simple two minute job and requires no electronic skills. This keyboard does not need any soldering. Please specify on order whether you require the ZX 81 or Spectrum case.

SPECTRUM MODEL

This is supplied with spectrum legends, and a slightly different base for fitting the spectrum inside, again all the connectors are at the rear of the case and there is plenty of room for the power supply (and other add-ons). Should you want to change, we can supply both the Spectrum legends and details of updating your case which will enable modification from the ZX 81 to spectrum. PLEASE specify on your order whether you require the ZX 81 or spectrum case.



Internal fixing for ZX 81 keyboard case.



Internal fixing for spectrum keyboard case.

SPECTRUM LIGHT PEN

The pen enables you to produce high resolution drawings on your own television set, saving a vast amount of time over using basic programming statements, such as Plot, Draw etc. You can erase, modify and save drawings and it comes complete with software program. The superb light pen is available from D.K. tronics.

$49.95

SPECTR

16K Memory E

The 16K uses 41
Static Ram and
using the Static
speed low powe
the computer.
which comes to
where. Position

64K Memory E

All the above
advantage lies
56K of usable
the use of othe
8192-65536. Th

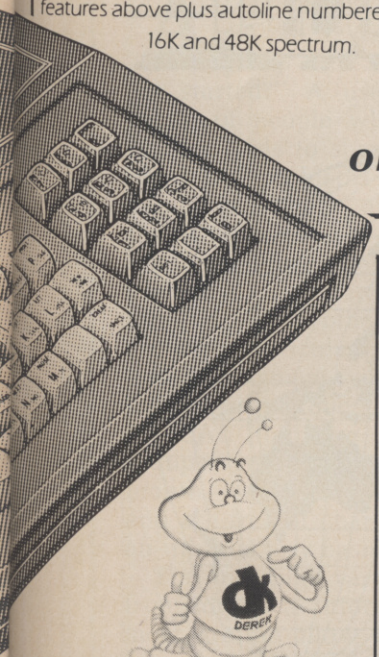
Spectrum Mem

Upgrade your S
it is simply slipp
are supplied, a
time. The fitting
same as Sincla

ZX 80~81 Spectrum HARDWARE

SPECTRUM/81 TOOLKIT

This is the toolkit which won acclaim in the feature in the August 1982 issue (pages 29 and 30) of Sinclair User. "It is the most impressive program, fast in execution with clear and full instructions...it stands out from the rest of the field." The ZXED is a powerful editor for use on the expanded ZX81. It is intended for use by the serious BASIC programmer and offers several useful and time saving features most helpful during all stages of program development. The facilities provided are as follows: ALTER, BYTES, COPY, DELETE, FIND, HELP, INSERT, KEEP, MOVE, RENUMBER AND VERIFY. The Spectrum Toolkit contains most of the features above plus autoline numberer and append, and will run in the 16K and 48K spectrum.



Both at only $12.95

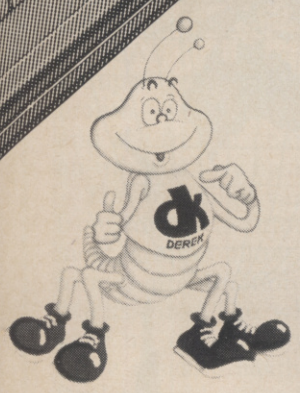
4K GRAPHICS ROM *$44.95*

The DK Graphic module is our latest ZX 81 accessory. This module unlike most other accessories fits neatly inside your computer under the keyboard. The module comes ready built, fully tested and complete with a 4K graphic ROM. This will give you an unbelievable 448 extra pre-programmed graphics, your normal graphic set contains only 64. This means that you now have 512 graphics and with their inverse 1024. This now turns the 81 into a very powerful computer with a graphic set rarely found on larger more expensive machines. In the ROM are lower case letters, bombs, bullets, rockets, tanks, a complete set of invaders graphics and that only accounts for about 50 of them, there are still about 400 left (that may give you an idea as to the scope of the new ROM). However, the module does not finish there, it also has a spare holder on the board which will accept a further 4K of ROM/RAM. This holder can be fitted with a 1K/2K/RAM and can be used for user definable graphics so you can create your own custom character sets.

WHY WAIT?
ORDER TODAY FOR FAST DELIVERY

FLEXIBLE RIBBON CONNECTOR

If you have ever had whiteouts or system crashes this could be the answer. It stops the movement between the computer and the RAM expansion, it is supplied with a ribbon, 6 inches long, with a male connector at one end and a female at the other, at only *$35.95*



16/64 MEMORY FOR ZX 81

16K Memory	*$41.95*
16K (uncased)	*$35.95*
64K Memory	*$135.00*
64K (uncased)	*$132.00*

The above illustration shows the casing for the 16K or massive 64K.

UM MEMORY

ansion *$41.50*

ynamic Ram Chips. We use the dynamic as they are much denser than py less space. They are also much cheaper than the equivalent product s. The Ram is manufactured with high quality materials, and uses high ms. It is supplied ready-built and only needs to be plugged into the rear of he components are fitted into holders. This massive add-on memory u fully assembled and tested is the cheapest 16K memory available any- nemory from 16384 to 32768. (Same as the Sinclair memory.)

16K (UNCASED) *$35.95*

ansion *$135.00*

nation on the 16K also applies to the 64K Memory Expansion, but the e 64K giving nearly FOUR times the memory. This advanced model has ory. In addition, the block from 8K to 16K can be switched out to enable d-ons. The graphics ROM is to be used in this area. Position in Memory: ck From 8192-16384 is switchable.

64K (UNCASED)*$132.00*

y Expansion *$54.00*

rum to 48K of user Ram. The Spectrum memory expansion is simple to fit, side the case, and then only requires plugging in. Full fitting instructions e only tool you will need is a screwdriver and just two minutes of your uires no electronic skills. Position in memory from 32768 to 65536. (The pgrade to 48K).

Please state type of machine, which Rom memory size, quantity and place when ordering

Please send me . . . . . @ $ . . . . . .

Please send me . . . . . @ $ . . . . . .

Please send me . . . . . @ $ . . . . . .

Please add on *$9.00* for P/P

In enclose cheque/P.O. payable to DK Tronics total £ . . . . . .

or debit my Access/Barclaycard

Mastercard

Signature . . . . . .

Name . . . . . .

Address . . . . . .

. . . . . .

Send to DK Tronics Ltd, Unit 2, Shire Hill Ind Est, Saffron Walden, Essex CB11 3AQ, England.
Tel: (0799) 22036 (trade enquiries please telex 81653 attn. DK)

dk'tronics

New colour brochure now available, send $1.00 for quick return

For more information, circle 28 on Reader Service Card.

TS1000-ZX81 OWNERS WIN $20,000

ENTER THE ULTIMATE ADVENTURE

SOLVE 12 CLUES LIKE THIS!

Where it all began. Where the torch was first lit. Where muscles and sinews strain. Where our heros win acclaim. Where the symbols hold the key.

KRAKIT™ consists of 12 clues on a ready-to-run ZX81 or TS1000 cassette tape (16k RAM). The answer to each clue is the name of a country, a city or town, and a number. If you are the first qualified entrant to solve all 12 clues and declared the winner, you receive two tickets to the city of the secret KRAKIT™ vault location. When you arrive at that location, a check for a minimum amount of $20,000.00 (U.S.) will be presented to you. The amount of the prize money is augmented weekly.

TS1000 - ZX81

Mail to:
INTERNATIONAL PUBLISHING & SOFTWARE INC.
P.O. BOX 1654, BUFFALO, N.Y. 14216

Please send ____ copies of KRAKIT™ at $19.95 plus $1.50 shipping.

Total _____ enclosed is ☐ check ☐ money order

Charge to ☐ Visa ☐ Mastercard

Number _____

Expiry _____ Signature _____

Please print:

Name _____

Address _____

City _____ State _____

Zip _____

Allow 2 weeks for personal checks.

For more information, circle 29 on Reader Service Card.

How I started a user group

Forming one is easy when you follow Sue Mahoney's tried-and-true method

A LOT OF PEOPLE have asked me, "What is a user group and how does one get started?" A user group is a group of people who meet on a regular basis to share and discuss ideas and problems regarding the computer. There are many different types of user groups. Some are formed by owners and users of a brand of computer, such as Timex Sinclair, while others are formed around a particular type of application or language such as Telecommunications, Robotics, Business or PASCAL (to name a few). These groups generally meet once a month, welcome new members, and are free of charge, at least on an introductory basis.

The meetings vary in structure from formal to informal; however, most groups allow time for both formal presentation and informal discussions. The whole idea is to have an opportunity to meet and share ideas, breakthroughs in particular problems, and information on hardware or software.

Most user groups charge a nominal fee (between $10 and $20 per year) for membership. This helps defray the expense of printing and mailing newsletters, and other operational costs. Most user groups are non-profit organizations run by volunteers. Some advantages of the non-profit status: donations of products, materials or space are tax deductible for the donor; bulk mailing costs considerably less; and most newspapers will publish announcements about meetings at no charge, provided you meet their lead times.

Now that I've described what a user group does, I'd like to explain how I started one. In September 1981, I was just completing some contract work for the American headquarters of Sinclair Research Ltd. in Boston. I was very excited about helping plan the introduction of Sinclair's ZX81 into the United States. Even then, I believed that this computer would revolutionize the American public, because it would allow people who previously could not afford a computer an opportunity to buy one, learn how it works, and develop new applications for its use.

I was so anxious to meet people who were working with their Sinclair computers, I decided to form a user group. My first step was to approach Johnathan Rotenberg, founder and president of the Boston Computer Society. BCS is the largest and most prestigious personal computer society in the country, and boasts more than 20 different user groups and 7000 members throughout the world. Since BCS did not have a Sinclair user group, and I lived in Boston, Johnathan agreed I could start one under the umbrella of BCS, and I was off and running.

My next step was to set a date, time and place for a meeting, and publicize it. I really did not know how many people to expect at the first meeting set on a Wednesday evening in October 1981 and was pleasantly surprised to see 18 people attend. The agenda for this meeting was rather informal. I explained the purpose of the group and got people to share their ideas and experiences. I was very encouraged by the synergy that developed in the discussion.

We experienced growing pains. At subsequent meetings, we expanded at a 20 to 50 per cent rate per meeting, and out-grew our meeting room four times. Our audience grew from 18 to more than 100 people in four months; some meetings have been attended by almost 200.

Our actual membership as of February, 1983, is around 600 people, most of whom are from New England; however, we have had some individual members from other parts of the country who joined just to receive our newsletter, as well as other BCS benefits.

In addition, we have a policy whereby any other Timex Sinclair

Sue Mahoney (second right) with members of the Boston user group

user group mails us its newsletter and we send it our newsletter free. Consequently, in February, we mailed more than 700.

In July, 1982, because we wanted to support owners, users and potential owners of both the Sinclair and the Timex computers, we changed our group name to Sinclair Timex user group.

Regarding the regular monthly meetings, I believe that it is very important for the people attending to feel they are an integral part of the group, so I structure the meeting to provide ample opportunity for people to contribute and interact.

During the first one and a half hours, we usually have a few people scheduled to make a presentation on some aspect of the computer; for this we rely heavily on active group members. Many of our members have started their own companies (EZ Key, King Software, Siriusware) as a direct result of their participation in the group. Occasionally, we hear speakers from companies that provide owners and users of Timex or Sinclair computers with hardware, software, publications or services.

October 20, 1982, was our first anniversary. We were extremely fortunate to get both Dan Ross, Chief Operating Officer for Timex Computer Corporation and Margaret Bruzelius, Executive Vice President for U.S. Operations, Sinclair Research Ltd. to speak to our group. They gave us some background on their respective companies, described what they feel the future holds for owners and users of their respective products, and answered questions.

After our speakers, we generally have a short break so people can look at displays and talk. Then we reassemble, hear announcements from the group, and break into smaller interest groups. These include: a beginners' group (I always encourage prospective buyers to come and ask questions of actual owners); advanced groups in assembly language, FORTH, and other specialties; and groups structured around special interests, such as education and genealogy.

Sometimes our user group undertakes special activities. Last summer, we sponsored a two day kit-building session, during which anyone with a ZX81 kit received free assistance in constructing it. Three of our members circulated around the room, helping others, including some who had never touched a soldering iron before.

We plan to have a seminar on assembly language for the Timex Sinclair in the future.

Our newsletter, one of our ongoing activities, has expanded from a one page, hand-printed announcement of the next meeting, to an 8-page, typeset newsletter with articles about hardware, software, programs to try, as well as a recap of the last meeting and highlights of the next.

Sue Mahoney: starting up

We have just formed a library committee. We have had some books, software and monthly publications donated, and are organizing this material so that it can be checked out and used by members.

I am also looking forward to the future when we will have access to modems so that we can communicate with one another through various data banks. We probably will put our newsletter on one of the national data bases within several months.

In conclusion, there is some work involved in starting and running a user group. You must be willing to listen to others and be able to enlist their help and support, especially if you want the group to grow.

You must involve many people on many different levels, in such essentials tasks as the planning and coordinating of meetings; writing, editing, and getting advertising for the newsletter; getting it printed and mailed; making signs for the meeting place; getting meetings publicized; and so on. Another key factor is to structure the meetings and activities to encourage new members: otherwise you may stagnate. Recruiting new members is very important in keeping the group alive.

Personally, I can say that this has been an extremely rewarding experience for me. By starting this group, I have met and talked with many interesting people who have been extremely enthusiastic about the Timex Sinclair computer. It has also opened doors for me professionally. In November, 1982, I became Technical Support Manager for Timex Computer Corporation in their Corporate Headquarters in Middlebury, Connecticut.

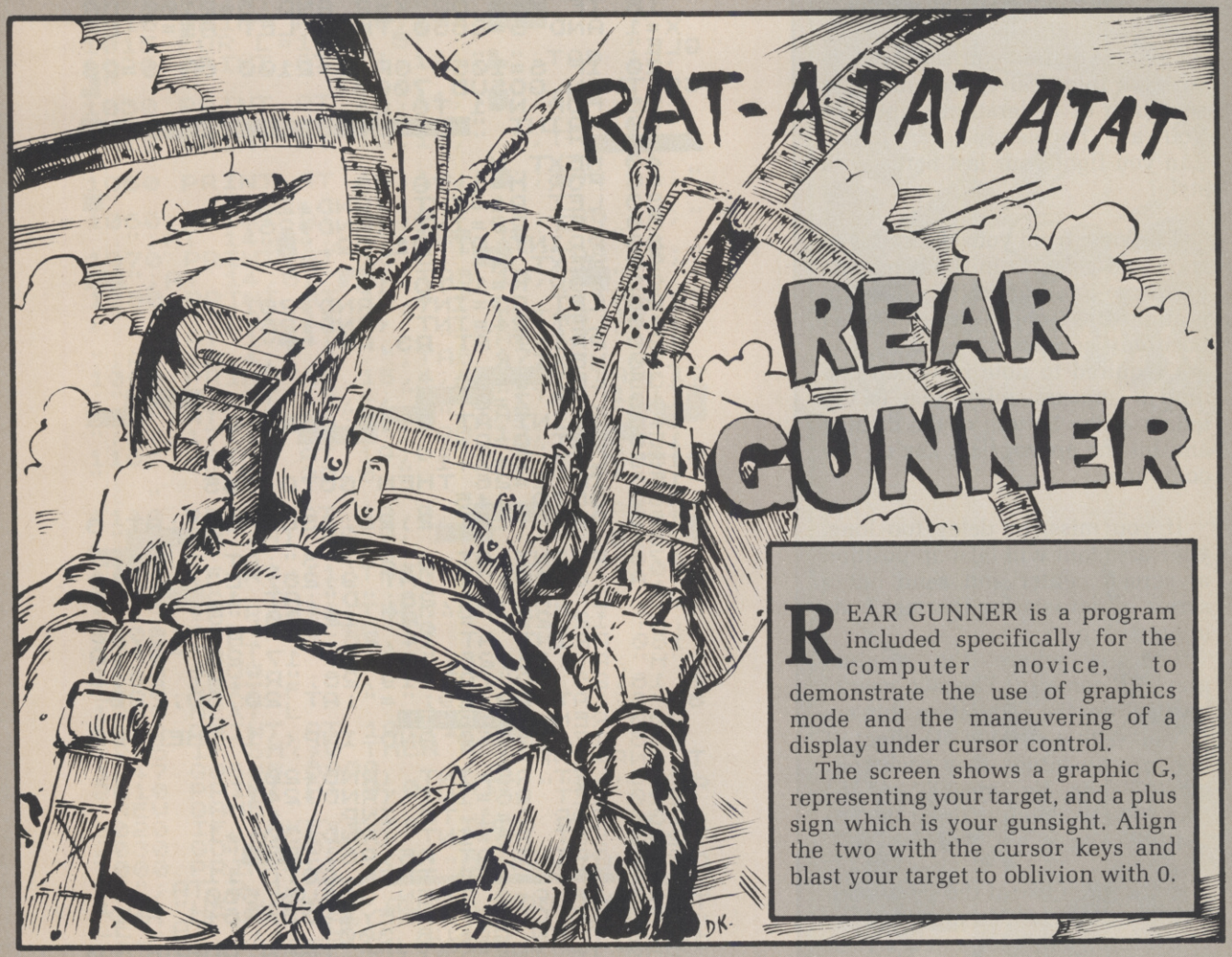
Our user group is composed of people from all walks of life and all ages, including engineers, educators, businessmen, students, and clergy, to name a few. Every third Wednesday, we meet with information to exchange and enthusiasm to share.

Susan C.T. Mahoney, founder and director of the Sinclair Timex User Group, Boston Computer Society, Boston, Massachusetts, is also Technical Support Manager for Timex Computer Corporation, Middlebury, Connecticut.

Next month, we will publish a comprehensive list of user groups from across North America. If you would like your group to be included, please write to:

Timex Sinclair User
User Group List
49 LaSalle Ave.
Buffalo, New York
14214

PROGRAM PRINTOUT



REAR GUNNER is a program included specifically for the computer novice, to demonstrate the use of graphics mode and the maneuvering of a display under cursor control.

The screen shows a graphic G, representing your target, and a plus sign which is your gunsight. Align the two with the cursor keys and blast your target to oblivion with 0.

```
  5 PAUSE 50
 10 LET A=5
 20 LET B=7
 30 LET C=INT (RND*26)
 40 LET D=INT (RND*17)
 50 PRINT AT D,C;"(graphic G)"
 60 PRINT AT A,B;" + "
 70 PRINT AT A-1,B;"   "
 80 PRINT AT A+1,B;"   "
 90 IF INKEY$="5" THEN LET B=B-1
100 IF INKEY$="8" THEN LET B=B+1
110 IF INKEY$="7" THEN LET A=A-1
120 IF INKEY$="6" THEN LET A=A+1
130 IF INKEY$="0" THEN GOTO 150
140 GOTO 50
150 IF D<>A THEN GOTO 50
160 IF C=B THEN GOTO 170
170 PRINT AT D-1,C;"(graphic
Y;SPACE;graphic T)"
180 PRINT AT D,C;"(SPACE;inverse
SPACE;SPACE)"
190 PRINT AT D+1,C;"(graphic
T;SPACE;graphic Y)"
200 RUN
```

REMARKABLE graphics effects are the striking feature of **Phasor** for the 16K T/S1000,ZX81. You are an infamous space pirate travelling home through hyperspace after a hard day's murder and mayhem. Suddenly you find yourself wrenched back into real space/time by a squadron of Federation star-ships. You are hopelessly surrounded. Can you fight your last battle with style?

The view from your cockpit is of stars and galaxies in the blackness of space. Each attracting star-ship is an inverse 0 appearing at random positions around the screen. You are required to note in which column it appears, relate that to the letters at the bottom of the display and hit the appropriate key on the computer.

If you miss, or delay too long, your assailant will take up position at screen center and send out a series of devastating thermal bolts at your ship.

That is where the original graphics come in. The two energy beams from the Federation ship approach with a striking 3D effect. If they are on target, they rock your pirate ship by means of the FAST/SLOW loop in lines 1200 to 1240. Excellent!

You cannot fire at the ship when it is firing at you. You must destroy 15 ships to qualify for a new screen and the game speeds up as each screen is cleared. If you break into the program, remember to re-start it with "RUN2", since the program saves itself in line 1.

A series of honorary accolades is awarded for a high score. Anything above 1,050 gains the accolade of Starfalcon, Starhawk or Stareagle, depending on the level of difficulty selected. You will have to be good, though, since the author of the program, Marcus Harvey, has managed a personal best of only 550. Let us know you how make out!

```
    1 SAVE "■"
    2 CLS
    3 PRINT "PHASOR";AT 1,0;"■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■"
    4 PRINT "WHAT LEVEL OF DIFFICULTY?"
    5 PRINT "(1,2,OR 3)"
    6 INPUT X
    7 IF X>3 OR X<0 THEN GOTO 6
    8 LET INP=(1/INT X)*25
    9 CLS
   10 LET S=0
   11 LET SH=5
   12 LET P=20
   13 LET I=0
   15 CLS
   16 IF X=1 THEN LET A$=" FALCON"
   17 IF X=2 OR X=1 AND S=2100 THEN LET A$=" HAWK"
   18 IF X=3 OR X=2 AND S=2100 OR X=1 AND S=2850 THEN LET A$=" EAGLE"
   20 IF S=1050 OR S=2100 OR S=2850 THEN GOSUB 7000
   25 FOR N=1 TO 21
   30 PRINT "■■■■■■■■■■■■■■■■■■■
```

```
  500 REM [illegible]
  510 IF P<>0 THEN LET P=P-1
  520 PRINT AT 20,30;"  ";AT 20,3
0;P
  525 FOR J=1 TO 5
  530 PRINT AT 0,0;"ALIEN FIRE3"
  535 NEXT J
  540 LET R7=INT (RND*3)+1
  545 PRINT AT 0,0;"[illegible]"
  546 GOSUB 1000
  550 IF R7<>1 THEN RETURN
  555 FOR Y=1 TO 5
  560 PRINT AT 0,0;"ALIEN HIT3"
  565 PRINT AT 0,0;"[illegible]"
  566 NEXT Y
  570 LET SH=SH-1
  580 IF SH<0 THEN GOTO 1000
  590 PRINT AT 12,30;SH
  600 RETURN
1000 REM FIRE GRAPHICS
1005 PRINT AT R5,R6;"[illegible]"
1010 PRINT AT 10,11;"[illegible]"
1015 FOR L=1 TO 5
1020 PRINT AT 11,11;"[illegible]";TAB 13;"
[illegible]"
1030 PRINT AT 11,11;"[illegible]";TAB 13;"
[illegible]"
1040 PRINT AT 12,10;" ";TAB 14;"
 "
1050 PRINT AT 12,10;"[illegible]";TAB 14;"
[illegible]"
1060 PRINT AT 13,8;"  ";TAB 15;"
  ";AT 14,8;"  ";TAB 15;"  "
1070 PRINT AT 13,8;"[illegible]";TAB 15;"
[illegible]";AT 14,8;"[illegible]";TAB 15;"[illegible]"
1080 PRINT AT 15,4;"  ";TAB 17
;"    ";AT 16,4;"    ";TAB 17;"
   ";AT 17,4;"    ";TAB 17;"
";AT 18,4;"    ";TAB 17;"    "
1090 PRINT AT 15,4;"[illegible]";TAB 17
;"[illegible]";AT 18,4;"[illegible]";TAB 17;"[illegible]
[illegible]";AT 16,4;"[illegible]";TAB 17;"[illegible]
";AT 17,4;"[illegible]";TAB 17;"[illegible]"
1100 PRINT AT 19,0;"  ";TAB 21;
"    ";AT 20,0;"    ";TAB 21;"
   "
1110 PRINT AT 19,0;"[illegible]";TAB 21
;"[illegible]";AT 20,0;"[illegible]";TAB 21;"[illegible]
[illegible]"
1111 IF R7<>1 THEN PRINT AT 10,1
1;"[illegible]"
1115 IF R7<>1 THEN RETURN
1200 FOR F=1 TO 10
1210 FAST
1220 SLOW
1230 NEXT F
1240 NEXT L
1242 PRINT AT 10,11;"[illegible]"
1245 IF SH<>0 THEN RETURN
1247 GOSUB 8000
2010 PRINT AT 0,0;"HIT ""R"" FOR
 NEW GAME."
2020 IF INKEY$="R" THEN RUN 2
2030 GOTO 2020
7000 PRINT AT 1,1;"CONGRATULATIO
NS";AT 2,1;"[illegible]";AT
4,1;"WE HEREBY AWARD YOU THE TIT
LE";AT 5,1;"OF: ""STAR";A$;"""."
;AT 8,1;"KEEP ON FIGHTING, COWBO
Y."
7010 PAUSE 300
7020 CLS
7030 RETURN
8000 REM END
8010 FAST
8015 FOR U=0 TO 20
8020 PRINT AT U,0;"
                "
8025 NEXT U
8030 SLOW
8035 FOR U=1 TO 80
8040 LET R9=INT (RND*4)+1
8050 IF R9>1 THEN LET B$="."
8060 IF R9=1 THEN LET B$="."
8070 PRINT AT INT (RND*20),INT (
RND*26);B$
8080 NEXT U
8100 RETURN
```

THE CHILDREN are screaming, the sun is roasting, it is a perfect day for the beach. You are the budding entrepreneur on the lemonade stand, trying to outsell your rivals and lay the foundations of a fast food empire.

You start with capital of $50 and have to decide how much to spend on advertising, how much on stock and what price to charge for each glass.

Lower-case letters in the listing signify inverse video (16K T/S1000,ZX81).

LEMONADE

```
 278 PRINT "L   E   M   O   N
A   D   E"
 279 PRINT "--------------------
---------"
 280 PRINT AT 10,0;"DO YOU REQUI
RE INSTRUCTIONS ?                (Y/
N)"
 290 LET A$=INKEY$
 300 IF A$="Y" THEN GOTO 9000
 310 IF A$="N" THEN GOTO 330
 320 GOTO 290
 330 CLS
 340 PRINT AT 10,0;"HOW MANY PLA
YERS (2-4) ?"
 350 INPUT P
 360 IF P<2 OR P>4 THEN GOTO 350
 361 CLS
 362 PRINT AT 10,0;"HOW MANY DAY
S DO YOU WANT TO                PLAY
(MAX=14) ?"
 363 INPUT AD
 364 IF AD<1 OR AD>14 THEN GOTO
363
 369 CLS
 370 DIM M(P)
 380 DIM A(P)
 390 DIM R(P)
 395 DIM L(P)
 400 DIM B(P)
 410 DIM Q(P)
 420 DIM I(P)
 430 FOR F=1 TO P
 440 LET M(F)=25
 450 NEXT F
 460 FOR F=1 TO P
 470 LET A(F)=0
 480 NEXT F
 490 FOR F=1 TO P
 500 LET R(F)=0
 510 NEXT F
 520 FOR F=1 TO P
 530 LET B(F)=0
 531 NEXT F
 532 FOR E=1 TO AD
 533 PRINT "L  E  M  O  N  A  D
E   day ";E;AT 2,0;"(thirty two
graphic 7s)"
 534 LET W=INT (RND*4)
 535 IF W=0 OR W=3 THEN LET W$="
sunny"
 536 IF W=1 THEN LET W$="rain"
 537 IF W=2 THEN LET W$="snow"
 538 PRINT AT 10,10;W$
 539 PRINT AT 15,0;"LEMONDSVILLE
WEATHER REPORT"
 540 FOR U=1 TO 100
 541 NEXT U
 551 LET AP=INT (RND*3)+1
 552 LET BP=INT ((RND*4)+1)*0.5
 553 FOR F=1 TO P
 560 CLS
 570 PRINT "L   E   M   O   N
A   D   E"
 571 PRINT ,,"(twenty nine graph
ic 7s)"
 580 PRINT ,,,,,,"player ";F
 590 PRINT ,,,,"money $";M(F)
 600 PRINT ,,,,"advertisements ?
$";AP                EACH BOARD COSTS
 610 INPUT A(F)
 660 PRINT AT 12,15;A(F)
 670 PRINT AT 13,0;"
 680 LET M(F)=M(F)-(A(F)*AP)
 690 PRINT AT 9,7;M(F);"  "
 700 PRINT AT 15,0;"bottles ?
MAKES 10 GLASSES"    EACH BOTTLE
 710 PRINT "BOTTLES COST $";BP
 720 INPUT B(F)
 770 PRINT AT 15,8;B(F)
 775 LET M(F)=M(F)-(B(F)*BP)
 790 PRINT AT 9,7;M(F);"  "
 800 PRINT AT 16,0;"

onade per glass ? Price of lem
 810 INPUT L(F)  IN DOLLARS"
 820 LET L(F)=INT ABS L(F)
 830 PRINT AT 18,28;L(F);"P"
 835 PRINT AT 19,0;"
 840 FOR T=1 TO 100
 850 NEXT T                  "
 860 NEXT F
 870 IF W$="sunny" THEN LET G=17
5
 880 IF W$="rain" THEN LET G=75
 890 IF W$="snow" THEN LET G=10
 900 CLS
 910 PRINT "L  E  M  O  N  A  D
E   day ";E
```

```
 920 PRINT ,,"(thirty two graphi
c 7s)"
 921 PRINT AT 6,9;W$
 925 LET V=INT (RND*50)+G
 930 PRINT AT 6,9;W$
 940 PRINT AT 10,0;"TODAY THERE
WERE ";V;" VISITORS"
 950 FOR U=1 TO 125
 960 NEXT U
 970 CLS
 980 DIM S(P)
 990 FOR C=1 TO P
1000 LET Q(C)=(B(C)*10)
1010 NEXT C
1020 FOR C=1 TO P
1030 LET I=V*10
1040 LET S(C)=I/L(C)
1050 IF L(C)>30 AND L(C)<=50 THE
N LET S(C)=INT (RND*(V/(V-2)))
1060 IF L(C)>50 THEN LET S(C)=0
1070 LET Z=(RND*(A(C)*5))
1080 LET S(C)=S(C)+(Z*2)
1085 LET S(C)=INT (S(C)*0.75)
1090 NEXT C
1095 LET N=0
1100 FOR O=1 TO P
1110 LET N=N+S(O)
1120 NEXT O
1130 IF N>V THEN LET M=N-V
1140 IF N>V THEN LET M=INT (M/P)
1150 IF N>V THEN FOR Y=1 TO P
1160 IF N>V THEN LET S(Y)=S(Y)-M
1170 IF N>V THEN NEXT Y
1180 FOR H=1 TO P
1190 IF S(H)>Q(H) THEN LET S(H)=
Q(H)
1195 IF S(H)<0 THEN LET S(H)=0
1196 IF S(H)>V THEN LET S(H)=V
1200 NEXT H
1210 FOR J=1 TO P
1220 PRINT "L   E   M   O   N
A   D   E"
1230 PRINT ,,"(twenty nine graph
ic 7s)"
1241 LET MY=INT (S(J)*L(J))/100
1242 LET M(J)=M(J)+MY
1250 PRINT ,,,,"player ";J;"
  money $";M(J);"   "
1260 PRINT ,,,,"you sold ";S(J);
" glasses"
```

```
1265 PRINT ,,,,"you had enough l
emonade for ";Q(J)
1266 PRINT ,,,,"price of lemonad
e per glass ";L(J);"P"
1267 PRINT ,,,,"advertisements "
;A(J)
1270 PRINT ,,,,"profit $";MY-BP*
B(J)-AP*A(J)
1280 FOR U=1 TO 100
1290 NEXT U
1300 CLS
1310 NEXT J
1320 NEXT E
1330 GOSUB 10
1335 PRINT AT 5,19;
1340 FOR U=1 TO P
1345 PRINT TAB 19;"player ";CHR$
(U+156)
1350 PRINT TAB 21;"$";M(U)
1360 PRINT
1365 PRINT
1370 NEXT U
1380 PRINT AT 3,0;"ANOTHER GAME
(Y OR N) ?"
1390 LET X$=INKEY$
1400 IF X$="Y" THEN GOTO 330
1410 IF X$="N" THEN STOP
1420 GOTO 1390
8998 SAVE "LEMONADe"
8999 RUN
9000 CLS
9010 PRINT "   L E M O N A
  D E"
9020 PRINT ,,,,,,"THE OBJECT OF
 THIS GAME IS TO   MAKE AS MUCH M
ONEY ($) AS       POSSIBLE."
9025 PRINT "YOU OWN A STALL NEAR
 A BEACH IN THE RESORT OF LEMOND
SVILLE.YOU   SELL LEMONADE AND TR
Y TO MAKE A PROFIT.TO START WITH
 YOU HAVE   $50 TO BUY LEMONADE
FROM THE     WHOLE-SALER."
9030 PRINT "YOU CAN ALSO ADVERTI
SE YOUR      LEMONADE BUT IT ALL
COSTS MONEY."
9040 PRINT AT 21,0;"PRESS ANY KE
Y"
9050 IF INKEY$="" THEN GOTO 9050
9060 GOTO 330
9500 FOR F=1 TO 5
9510 NEXT F
9520 RETURN
```

MOST computer games require nothing except a quick finger on the cursor key. Most of the rest, those which require a bit of brain power, are adaptations of games when the word computer meant a person with an abacus.

London Bridge is one of the few routines we have seen which is original, was written for the computer, and which calls for nerve, thought and luck.

The display consists of a graphic representation of the bridge, seen from above, with the roadway made up of a random mix of the numbers 1 to 5, representing five types of flagstone. You are required to cross to the other bank but, as you would expect, London Bridge is falling down.

The computer will give you a number, perhaps 4. That tells you that one of the type 4 stones is about to fall into the river. In selecting your next move, therefore, you can gamble by moving onto a 4 or play safe by selecting a different number.

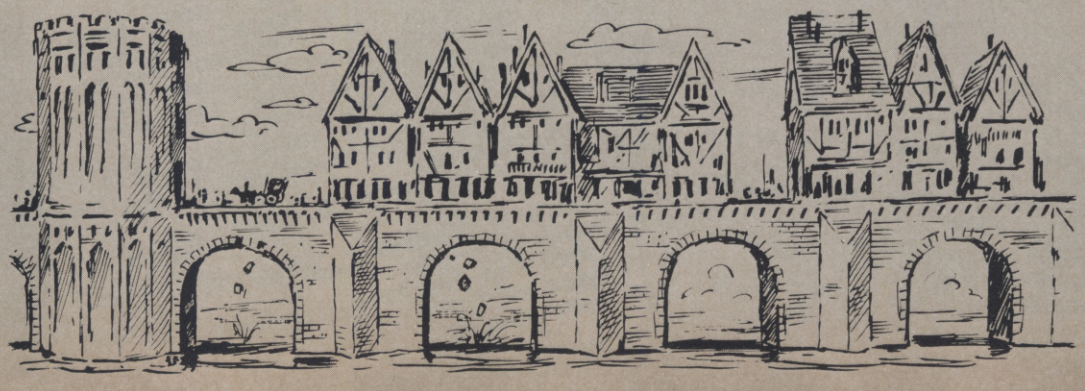
The player enters his move by following the nine-number grid displayed under "INPUT" in the bottom left of the screen; 7, for example, will move you left and down and 2 will send you backwards.

Invalid moves are ignored. You score 10, 20 or 50 points respectively for each move forwards, sideways or backwards, but taking risks trebles those scores and a high score is necessary to beat the world record of 1,700. Beware — don't dally too long at the start of the bridge — you may be cut off by successive collapses, and don't shilly-shally near the south bank because that is where the bridge is weakest.

We were impressed by the program and scored 1,900 after 12 attempts. (16K T/S1000,ZX81.)

London Bridge

```
   5 FAST
  10 RAND 0
  20 DIM A(66)
  30 PRINT AT 2,9;"LONDON BRIDGE
"
  40 LET WR=1700
  50 PRINT AT 16,25;"WR=";WR;TAB
 11;"▓          ▓";TAB 0;"INPUT";TA
B 1;"123";TAB 1;"4▓6";TAB 1;"789
"
  55 PRINT AT 6,11;"▓▓  ▓  ▓▓"
  60 FOR I=1 TO 11
  70 PRINT TAB 12;"▓     ▓"
  80 NEXT I
  90 FOR N=11 TO 50
 100 LET A(N)=INT (RND*5+1)
 110 LET A$=CHR$ (28+A(N))
 120 LET M=(N-1)/5
 130 GOSUB 500
 135 NEXT N
 140 LET N=8
 145 SLOW
 150 LET A(N)=-28
 155 PRINT AT 20,20;"TO COLLAPSE
"
 160 LET DROP=INT (RND*(67-N)+N-
6)
 170 IF A(DROP)<=0 THEN GOTO 160
 180 PRINT TAB 25;A(DROP)
 190 INPUT DIR
 200 LET I=(INT DIR-1)/3
 205 LET M=(N-1)/5
 210 LET J=M-INT M+I-INT I
 220 LET N1=N+5*(INT I-1)+3*(I-I
NT I, -1
 230 IF DIR<1 OR DIR>9 OR J<0.1
OR J>1.4 OR N1<6 THEN GOTO 190
 235 IF A(N1)<=0 AND N1<=60 THEN
 GOTO 190
 240 IF N1>60 THEN LET A(N1)=-28
 250 LET A$=CHR$ (28+A(N))
 260 GOSUB 500
 270 LET M=(N1-1)/5
 280 LET A$=CHR$ (156+A(N1))
 290 GOSUB 500
 300 PRINT AT 20,20;"
";TAB 25;" "
 310 FOR J=1 TO 70
 320 NEXT J
 330 LET M=(DROP-1)/5
 350 LET A$=" "
 360 GOSUB 500
 370 IF N1=DROP THEN GOTO 600
 380 IF N1>60 THEN GOTO 800
 390 LET SCORE=10*(3-INT I)+10*(
2-INT I)*(1-INT I)
 400 IF A(N1)=A(DROP) THEN LET S
CORE=SCORE*3
 410 GOSUB 900
 420 LET A(DROP)=0
 430 LET N=N1
 440 GOTO 155
 500 PRINT AT 5+INT M,13+5*(M-IN
T M);A$
 510 RETURN
 600 PRINT AT 20,16;"YOU HAVE FA
LLEN";TAB 18;"IN THE WATER"
 700 STOP
 800 LET SCORE=1000
 810 GOSUB 900
 820 STOP
 900 LET A(1)=A(1)+SCORE
 910 PRINT AT 11,22;"SCORE ";SCO
RE;" "
 920 PRINT AT 13,22;"TOTAL ";A(1
)
 930 RETURN
```



PROBABILITY

POISSON'S FORMULA is a method of calculating the possibilities of recurrence of an event, based on the number of occurrences in the past.

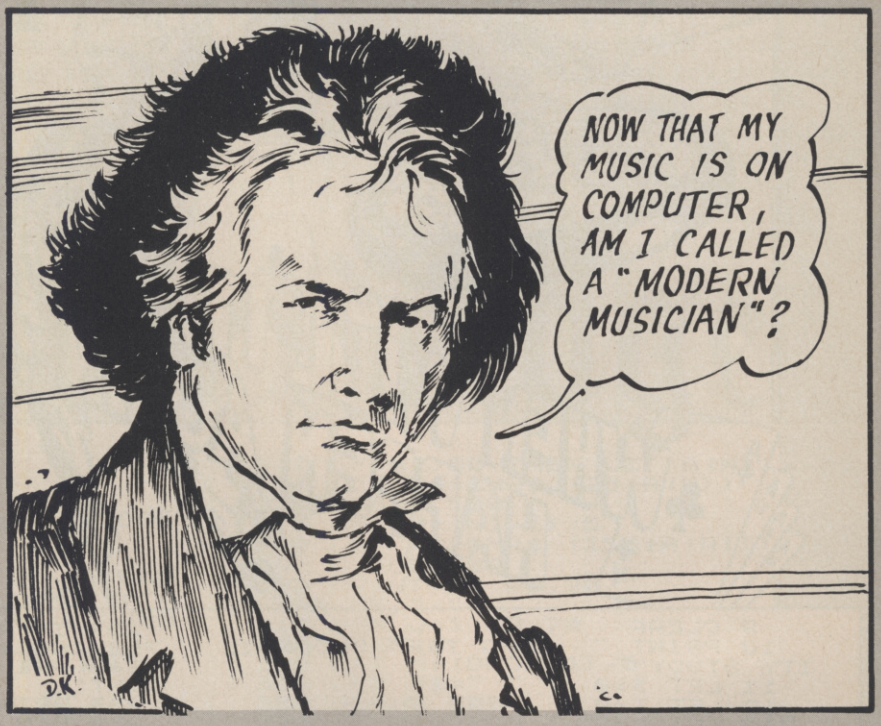
For this listing, the time should be adjusted so that the number of occurrences is in the range 3 to 12. The range could be extended upwards if required, but 2 has been omitted as it would mean an unreliably small sample.

The formula here is applied with a correction factor but that will not distort the results, since the same percentage is applied to all answers, thus keeping them in the same proportion. (1K T/S1000,ZX81)

```
   9 CLEAR
  10 PRINT "   LONG TERM PROBABIL
ITY  STUDY"
  11 LET S=0
  12 LET T=0
  13 LET U=0
  14 LET V=0
  15 LET W=0
  16 LET X=0
  17 LET Y=0
  18 LET Z=0
  20 LET AA=0
  22 LET BB=0
  25 PRINT
  30 PRINT "INPUT THE MAXIMUM OC
CURRENCES IN ANY ONE UNIT OF TIM
E"
  31 PRINT
  32 PRINT "       RANGE ALLOWED
3 TO 12"
  40 INPUT A
  45 CLS
  50 PRINT "INPUT TOTAL OCCURENC
ES"
  60 INPUT B
  70 PRINT
  80 PRINT "INPUT TOTAL TIME"
  90 INPUT C
  95 CLS
 100 LET D=B/C
 110 LET E=(1+(1/B))**B
 120 LET F=1/(E**D)
 130 LET P=F
 140 LET Q=D*F
 150 LET R=D**2/2*F
 160 IF A>=3 THEN LET S=D**3/6*F
 170 IF A>=4 THEN LET T=D**4/24*
F
 180 IF A>=5 THEN LET U=D**5/120
*F
 190 IF A>=6 THEN LET V=D**6/720
*F
 200 IF A>=7 THEN LET W=D**7/504
0*F
 210 IF A>=8 THEN LET X=D**8/403
20*F
 220 IF A>=9 THEN LET Y=D**9/362
880*F
 230 IF A>=10 THEN LET Z=D**10/3
628800*F
 233 IF A>=11 THEN LET AA=D**11/
39916600*F
 237 IF A=12 THEN LET BB=D**12/4
79001600*F
 240 PRINT "PROBABILITY OF","PER
CENT"
 250 PRINT
 252 REM CORRECTION FACTOR
 255 LET N=P+Q+R+S+T+U+V+W+X+Y+Z
+AA+BB
 260 LET PP=(INT (P*10000/N+0.5)
)/100
 270 LET QQ=(INT (Q*10000/N+0.5)
)/100
 280 LET RR=(INT (R*10000/N+0.5)
)/100
 290 LET SS=(INT (S*10000/N+0.5)
)/100
 300 LET TT=(INT (T*10000/N+0.5)
)/100
 310 LET UU=(INT (U*10000/N+0.5)
)/100
 320 LET VV=(INT (V*10000/N+0.5)
)/100
 330 LET WW=(INT (W*10000/N+0.5)
)/100
 340 LET XX=(INT (X*10000/N+0.5)
)/100
 350 LET YY=(INT (Y*10000/N+0.5)
)/100
 360 LET ZZ=(INT (Z*10000/N+0.5)
)/100
 363 LET AAA=(INT (AA*10000/N+0.
5))/100
 366 LET BBB=(INT (BB*10000/N+0.
5))/100
 370 LET A$="0 OCCURRENCES"
 380 LET B$="1          """
 390 LET C$="2          """
 400 LET D$="3          """
 410 LET E$="4          """
 420 LET F$="5          """
 430 LET G$="6          """
 440 LET H$="7          """
 450 LET I$="8          """
 451 LET J$="9          """
 452 LET K$="10         """
 455 LET L$="11         """
 457 LET M$="12         """
 570 PRINT A$,PP,B$,QQ,C$,RR,D$,
SS,E$,TT,F$,UU,G$,VV,H$,WW,I$,XX
,J$,YY,K$,ZZ,L$,AAA,M$,BBB,,,,PP
+QQ+RR+SS+TT+UU+VV+WW+XX+YY+ZZ+A
AA+BBB
```

BEETHOVEN

```
   1 REM 1234567890123456789012345678901234567890123
   2 REM ........................
.................................
.................................
.................................
.................................
.................................
  10 LET A$="... "
  20 LET A$=A$+"FFF"
  25 LET O=16567
  30 FOR I=1 TO LEN A$-1 STEP 2
  40 POKE O,(CODE A$(I)-28)*16+CODE A$(I+1)-28
  50 LET O=O+1
  60 NEXT I
  70 FAST
  80 LET K=USR 16546
  99 STOP
 100 SAVE "BEETHOVEn"
 110~PRINT "*******************************************BEETHOVEN*******************************************"
 120 PRINT ,,"PROGRAMME CREATED BY S. CRAINIC FOR THE SINCLAIR ZX81 +16K"
 130 PRINT ,,"EACH SOUND CORRESPONDS TO AN HE-XADECIMAL VALUE. IN ORDER TO OB-TAIN THE DESIRED MELODY,YOU MUSTENTER SUCCESSIVELY IN LINE 10   (LET A$=""... ..."") THE HEXADECI-MAL CODE OF EACH SOUND IN THEIR ORDER IN THE MELODY."
 140~PRINT "THE SOUNDS HAVE EQUAL LENGTHS. A LONGER DURATION OF A GIVEN    SOUND COULD BE OBTAINED BY ENTE-RING MANY TIMES SUCCESSIVELY THECODE CORRESPONDING TO THE SAME  SOUND. INTERVALS ARE OBTAINED BYENTERING THE ""00"" VALUE."
 145 PRINT AT 21,0;"HIT A KEY TO CONT."
 150 IF INKEY$="" THEN GOTO 150
 155 CLS
 160 PRINT " NOTE      1ST SCALE   2ND SCALE-------------------------------"
 165 DIM B$(2,24)
 170 LET B$(1)="F0E5D8CFC3B8ADA59C948B83"
 175 LET B$(2)="7A736B67605A56514B484440"
 180~LET C$="C    C+;D-D    D+;E-E    F    F+;G-G    G+;A-A    A+;B-B    "
 190 FOR I=1 TO 12
 200 PRINT C$(I*5-4 TO I*5);TAB 11;B$(1,I*2-1 TO I*2);TAB 24;B$(2,I*2-1 TO I*2)
 210 NEXT I
 220 PRINT ,,"AS EXAMPLES, SOME MELODIES WERE CODED IN LINES 1000...   IF YOU WANT TO ""PLAY"" ONE OF THEM, EN- TER run 1000, OR  1010...        >make the tone of your tv set   louder AND newline."
 230 PRINT AT 21,0;"    HIT A KEY TO CONT "
 240 IF INKEY$="" THEN GOTO 240
 245 CLS
 247 PRINT "EXCUSE ME, I""M WORKING..."
 248 FOR I=1 TO 30
 249~NEXT I
 250 FAST
 255 RUN 9990
1000 REM happy birthday
1005 LET A$="B8B800B800A5A500B8B8008B8B00949494940000B8B800B800A5A500B8B8008B8B00949494940000B8B800B800606060737373008B8B8B0094940 0A5A5A5006B6B006B737300949400838300949494"
1009 GOTO 20
1010 REM 40th symphony
1011 LET A$="B8C300C3C300B8C300C3C300B8C300C3C37A7A7A007A8394940094A5B8B800B8C3D8D800D8D8D800C3D800D8D8C3D800D8D800C3D800D8D8838383008394 9C9C009CB8C3C300C3D8F0F000F0F0007A830083836B6B9C9C83839494C3C3007A830083836B6B9C9C83839 4947A7A007A8394A5B8B8C3C3B8B8"
1019 GOTO 20
9989 STOP
9990~LET A$="7B3D20FDC906E05EAFBB280CDBFECD8240D3FFCD824018050E050D20FD10E8C921B740CD8740237EFEFF20F7C9"
9991 LET O=16514
9992 FOR I=1 TO LEN A$-1 STEP 2
9993 POKE O,(CODE A$(I)-28)*16+CODE A$(I+1)-28
9994 LET O=O+1
9996 NEXT I
9997 SLOW
9998 CLS
```



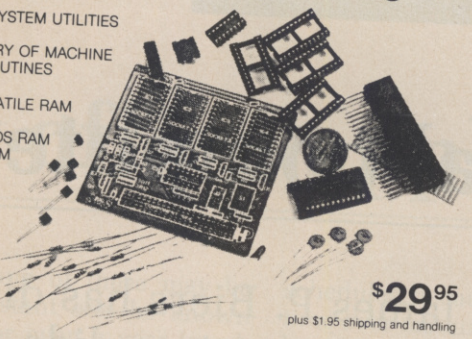
BEETHOVEN is a remarkable program which allows you to produce music from your T/S1000,ZX81. Stephane Crainic of Paris has linked hex values to the tones available from the speaker of your television set and has produced a table allowing you to convert the notes of the musical scale into those values.

When you have typed in the program, enter GOTO 110 so that you can read the instructions and the table of scales and hex codes. Then transpose your tune into hex. After reading the instructions and pressing keys to continue, the screen will show 0/9998.

Enter LIST 10, EDIT, and alter the A$ to the list of the hex values into which you have converted your tune. Increase the volume of your TV, enter GOTO 1 and your tune will be produced. The notes produced are all off-key but the quality is certainly acceptable when you consider how they are made. Lower-case letters in our listing signify inverse video (16K T/S1000,ZX81).

Extend your ZX81/TS1000: Add Memory that won't Forget!

- ADD YOUR OWN SYSTEM UTILITIES
- BUILD UP A LIBRARY OF MACHINE LANGUAGE SUBROUTINES
- UP TO 8K NONVOLATILE RAM
- USE HM6116LP CMOS RAM OR 2716/2732 EPROM
- COMPATIBLE WITH 16K RAM PACKS



$29.95

plus $1.95 shipping and handling

▶ *READ THE REVIEWS:*

What a super product!...conceived and executed very nicely...and with quality components.
(SYNTAX QUARTERLY Winter 82)

8K Nonvolatile memory is a gem! It has so many possible uses...I recommend this board most heartily.
(OKLAHOMA S.U.G. Newsletter 1/3)

We found the documentation to be far superior to that (of) most hardware we've received.
(S.U.N. Newsletter Nov/Dec 82)

For versatility this is even better than an EPROM...ranks quite high on the list of "must-haves".
(SYNC Magazine Mar/Apr 83)

INTRODUCTION

This memory board is designed to fill the transparent 8K block of memory (from 8 to 16K) in a ZX81-16K system. This area of memory is an ideal place to store, either permanently or temporarily, machine language routines or data which are to be used by the BASIC system.

A sample display routine, a program—merging routine, and procedures for storing utilities on tape are included with the kit.

The use of HM6116LP 2K CMOS RAM memory IC's with their own reserve power supply means that routines stored in the RAM are nonvolatile — the RAM retains its memory even when the ZX81 is switched off or reset. Moreover, being RAM, the routines you store in the memory are easily modified. The lithium cell supplied with the board will maintain sufficient reserve power for almost ten years.

ASSEMBLY

Complete step-by-step instructions in a 20 page manual make assembly of the board easy. Construction takes between two and three hours. The kit (pictured above) is complete with a silkscreened solder-masked printed circuit board, all capacitors, resistors, transistors, sockets, connectors, integrated circuits, and the lithium cell. The board is supplied with one 2K CMOS 6116LP-3 RAM — it will accomodate three more for a total of 8K.

Complete kit with 2K	
Additional three 6116LP-3	$29.95
Bare pc board & manual	$16.00
Assembled & tested with 2K	$13.05
Assembled & tested with 8K	$44.95
Shipping & handling per order	$59.95
	$ 1.95

Send check or money order to the address below.

HUNTER, 1630 FOREST HILLS DRIVE, OKEMOS, MI 48864

For more information, circle 30 on Reader Service Card.

Subscribe here

for Britain's First Electronics & Computer Applications Magazine, the publication with a unique blend of theory, projects, software and product reviews, plus science and general features on a wide variety of computing and electronics topics.

To keep well informed of changes in computer technology send the coupon today.

Electronics & Computing MONTHLY

Please put coupon in a sealed envelope to
Electronics & Computer Monthly
Subscription Dept
Competition House
Farndon Rd
Market Harborough
Leicestershire
England

I would like to subscribe to Electronics & Computing Monthly and enclose a cheque for £25 Air Mail, $13.95 Surface Mail.

Name_____

Address_____

Signature_____

ECM/10

For more information, circle 31 on Reader Service Card.

T1000

High Resolution Graphics

$60

114 PLOT modes including:

Points and various line types
Textured triangle fill
Absolute and relative co-ordinates
Line drawing to points off screen

Mixed text and graphics including PRINT at graphics cursor.

User defined graphics for space invaders etc

Screen COPY to printer

MAIL ORDER SHOP

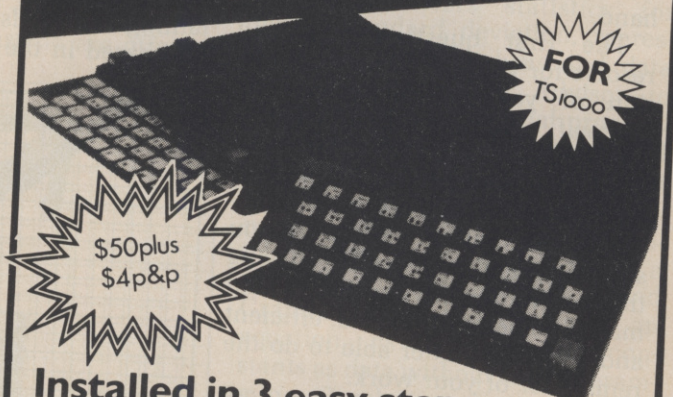
Notting Dale Technology Centre
189 Freston Road, London W10 6TH
Telephone: 01 969-8942

For more information, circle 32 on Reader Service Card.

ELECTRONIC

Klik Keyboard

AN ALTERNATIVE NOT AN ADD ON



Installed in 3 easy steps . . .

1. Peel of the touch sensitive key pad.
2. Plug in Klik-Keyboard (no soldering) and place in position.
3. Apply self adhesive two-colour legends to the keys.

This full 40 key keyboard has a positive click feel as the keys are depressed but as it replaces the original touch pad it becomes a permanent part of the ZX81 without bulky boxes or trailing wires.

KEMPSTON MICRO ELECTRONICS
180a Bedford Road, Kempston, Bedford MK42 8BL ENGLAND

For more information, circle 33 on Reader Service Card.

A personal computer with

Chicago's James P. Biers has discovered that his T/S1000 is a slide rule, calculator, desk-top planner, and more; and looks at business software.

When I started my business career, not so long ago, the slide rule and mechanical calculator were the mainstays of professional desktop computing power; but that was before the dawn of the integrated circuit. I can remember the day of my first electronic assistant, a $400 calculator that could add, subtract, multiply and divide. Oh yes, it also took square roots. Now 12 years later, we have at one quarter the price, a Timex Sinclair computer.

Although it is now possible to replace the electronic calculator with a remarkably priced desktop computer, is it worthwhile for the business person to make the change? Can tasks be done with ease at the office desk? Can the desktop computer take on some of the chores currently performed by mainframe or mini computers? The answers to these questions hinge on what work has to be done at the desk, on the time factors and on available software for the tasks at hand.

The first question you can resolve for yourself by an examination of your work needs. Ask yourself, "What do I do now that is time consuming or that I have to rely upon a data processing department to do for me, resulting in untimely information?" Secondly, you should examine whether having this work done at your desk would make you better informed, efficient and generally better able to do the remainder of your work.

Once you have looked at your job in this way, you should have an idea of where and how added computing power might help you. Next look at the process and information needed in these potential jobs for your Timex Sinclair. Simply put, the job to be done and the information required must match the capabilities of the machine.

A job that requires a large amount of stored data or access to the corporate base would probably not be a good choice for desktop processing. On the other hand, an examination of a cash flow and the discounting of the same to get a present value might well be an excellent choice.

Having made the decision for a desktop computer, you must either find packaged software or be able to write your own. Since your time and talents may not lie in the direction of software development, the package route may be your best bet.

Now let's backtrack briefly to see how this task of examination and software selection might work. Imagine yourself employed by a firm that makes several products containing materials which must be purchased in the open market and whose prices tend to have wide swings from time to time. Imagine further that two primary functions of your job are predicting these price swings and the preparation of weekly reports on the current breakeven point for your company's products.

As your first job requires access to a large data base and perhaps very involved math techniques, it may not be a good choice for desktop processing. There may also be strong arguments for consistency and for the need to avoid personal bias that will work against a decision for desktop processing of this job.

Your second job may, however, be an excellent choice for desktop computing. Although there might be several inputs to the breakeven

All the lady needed was . . .

many office applications

equations, many of these may be relatively constant and be known for a month or even a year in advance, so that their frequency of change would be small. Such inputs might be labor, fixed machinery charges, insurance and the cost of other materials that may have stable prices or be under long term contract prices. The only changing inputs to the breakeven equations would consist of the materials that have wide price movements.

In this hypothetical situation, the materials price projections are not a good choice while breakeven analysis is a strong possibility for desktop computing.

When reports are needed weekly, as in our given example, it would be convenient for you to have the desktop computing power. This would give you answers faster and more accurately than hand calculation methods and perhaps is more timely than submitting your information to a data processing department. Added advantages may be more flexible travel and meeting schedules because of either saved time over manual methods or in not having to meet input schedules of the data processing department. Also it may be possible to use even more current prices than at present, because of the lessened time now needed to prepare your reports.

Once you have decided you want desktop computing for your breakeven analysis, is there software available at a reasonable cost for the Timex Sinclair? The answer is yes. There is software that offers a breakeven analysis program as well as programs for examining cash flow problems and calculating depreciation and rates of return.

We have discussed one business application for the Timex Sinclair 1000. As people discover the substantial capabilities of this machine in the business area, they are seeking for more and more software. Programmers and software firms are producing it. This in turn leads to more business use and further software demand.

Currently the sources listed at the end of this article are offering business software. Among the substantial ones are Gladstone Electronics in Buffalo, New York, RUN-IT Software Club in Chicago, Illinois, and Softsync, Inc. in New York City.

I have authored two programs for business. Business Pac I is a comprehensive set of programs to help you manage your cash flow, measure your rate of return, keep track of depreciation and establish your production and sales breakeven levels. Business Pac II is for project scheduling and would be of assistance to anyone who needs to keep track of project hours, billings, variances and staff work loads. Soon to be released are a Personal Finance package that includes a check book/register program, a mortgage and rule of 78 loan program and net worth and budget programs. A personal investments package is also coming on the market. Most software companies are adding business or related packages to their line.

RUN-IT offers statistics for mean, standard deviation, regression and other analysis and data sorting, Real Estate Advisor to manage residential rental property and measure rates of return, and Computer Awareness series that teaches computer and programming concepts through sample programs. RUN-IT also offers a distinctly unique program called Graph-It which lets you enter an equation, its variables and constants as data without any programming. Graph-It analyzes the equation and plots the results in polar, or two or three dimensional form. This program would appear to have great applications in engineering, business, science, mathematics and teaching when you need to display a picture for clarity, impact or increased understanding. RUN-IT has plans for a financial assistance

. . . a T/S1000 to help organize her business

LEARN TO PROGRAM

Text and File Organizers with
ZX DATA FINDER

A high capacity information storage and retrieval tool for 16 K Timex and Sinclair Computers.

Advanced file input and editing routines are thoroughly analyzed.

Comprehensive search and display methods are fully explained.

AN ADVANCED COURSE IN DATA HANDLING

Free specifications are available, or send $9.95 for program listing and text to:

THOMAS B. WOODS
P.O. Box 64, Jefferson, N.H. 03583

For more information, circle 34 on Header Service Card.

TIMEX-SINCLAIR
ZX81 1000

1983 Directory

* **Where to find:** Disk Drives, RAM Extensions, Printers, Modems, Keyboards, Game & Serious Software, Books, Periodicals, Programming Aids, and other Exciting Accessories!
* **Articles on:** Special applications like Control Circuitry, Enhanced Graphics, Voice Generation, Music Synthesis, Video Inversion, Light Pens, Joysticks, etc.
* **Complete Descriptions:** We'll tell you what it is, what it does, how much it costs, and where to buy it.
* **Jam-packed w/photographs:** We knew you'd want to see what these products look like. So, we got pictures and put them in!

Only $5.00 ... Postpaid!

To Order: Send check, money order, or VISA/MC number and expiration date. MN residents add 6% sales tax.

Dealer Inquiries Welcome.

E. Arthur Brown Company
Dept. 1702 Oak Knoll Drive
Alexandria, MN 56308 Ph: 612/762-8847

Business

> "... breakeven analysis is a strong possibility for desktop computing"

package called Market-Guru and a commercial real estate advisor program.

Softsync produces a program, "The Financial Manager and Record Keeper," designed for small business budget management and record keeping. Their "Stock Market Calculator" was designed and written by an experienced stock market executive in conjunction with a leading brokerage firm. It contains three programs, Net Price Worksheet, Profit/Loss and Covered Write Worksheet. The first calculates commissions on stock and option investments. Profit/Loss uses the stock or option buy and sale prices to calculate commissions and net dollars and gives profit or loss. The third program is unique in the field. It allows you to try different prices and investment alternatives without having to re-enter all data every time.

DATA-ASSETTE offers, among other programs Finance/Bank for maintaining check book balances, ZX99 TEXT (a word processor) and the Budget/Forecaster which assists in the preparation of personal budgets.

Budget/Forecaster lets you establish categories of income and fixed and variable expenses for a twelve month period. You may enter information by month or category, obtain a summary report and save the results on tape. A built-in calculator lets you work with your budget numbers without exiting the program.

The Timex Sinclair is undoubtedly a business machine. Its capabilities in this area will receive greater recognition as more software becomes available. The Timex Sinclair has a definite place in the office. ☺/☺

SOME BUSINESS SOFTWARE SOURCES

Data-assette
Circle 11 on Reader Inquiry Card
Gladstone Electronics
Circle 12 on Reader Inquiry Card
RUN-IT Software Club
Circle 13 on Reader Inquiry Card
Sinclair Place
Circle 14 on Reader Inquiry Card
Softsync Inc.
Circle 15 on Reader Inquiry Card

Take it with you!

Fieldpro™ now makes it easy for you to carry your entire Timex/Sinclair computer system with you. Carry memory modules, cables, program book and cassette tapes in one case!

Made of waterproof DuPont® Cordura® nylon — fully foam-padded and soft-lined, this case will last for years.

Contact us for the dealer nearest you. Only $19.95. (If ordering direct, include $2.25 shipping charge.)

Also available, anti-static dust cover for $6.95. Order with case and save extra shipping charge.

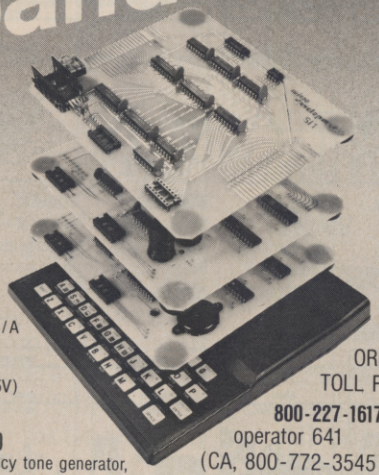
FieldPro
BY COVER CRAFT

P.O. Box 555, Amherst, New Hampshire 03031 • Telephone 603-889-6811

For more information, circle 35 on Reader Service Card.

LEARN COMPUTER CONTROL APPLICATIONS WITH THE...

Sinclair Expanders



TIMEX 1000, ZX-81 (80)

☐ **8-Port IO**
Interfaces up to eight one-byte ports
Accepts 16K RAM
IO $89

☐ **ADDA**
2-channels A/D, 2-D/A
Computer sensing and control of (analog) electrical devices (0-5V)
ADDA $89

☐ **Beeper (Clock / Switch)**
Programmable frequency tone generator, clock (milliseconds to years)...
BCS $89

ORDER TOLL FREE:
800-227-1617
operator 641
(CA, 800-772-3545 operator 641)

Each board comes with educational documentation, applications, and applications programs (1K RAM). $5 handling charge on all orders.

Box 1140
2000 Center Street
Berkeley, CA 94704

micro developments

For more information, circle 36 on Reader Service Card.

Synchro-Sette

The Subscription Magazine for the

SINCLAIR ZX-81 / TS-1000

MICRO COMPUTERS

Games, Educational, Business, Graphics, Tutorial, Etc.

12 Month Issues —
6 Bi-Month Cassettes
At Least 6 Programs Each

$39.50

Illinois residents add $2.07 Tax
Outside U.S.A add $10.00

24 HOUR HOT LINE:
(800) 543-1300
Ask For Operator 383.

THE S & S COMPANY
388 W. Lake Street
Addison, Illinois 60101
(312) 628-8955

VISA master charge

For more information, circle 37 on Reader Service Card.

CHANGE YOUR
TIMEX/SINCLAIR 1000 DISPLAY
TO FULL COLOUR GRAPHICS

with

KOLORWORKS

LOOK AT THE FEATURES ! ! !

* Plugs into ZX81/1000 (edge connector)
* All text will run on the color tv
* Module contains it's own memory
* User defined characters & graphics up to 256x192 pixels
* Latest technology with TMS9918 VDP (32 sprite levels)
* Module contains extension of basic commands including: PAPER/INK/BORDER/BIN/ SPRITE/OUT/INP/ etc.

for $149.95

Use your KOLORWORKS immediately with a game cassette for $9.95

This delightful game is designed for hours of fun using some of the color graphic capabilities of KOLORWORKS. The cassette also contains a short program to familiarize you with some of the commands and graphics.

MAIL TO:

BRAINCHILD COMPUTER WORKS, INC.
P.O. Box 506
Pewaukee, WI 53072

	Price +	Qty.	Amount
KOLORWORKS	$149.95		
CASSETTE	9.95		
Shipping and Handling	4.95		$4.95
Wi. Res. add Sales Tax			
My ☐check ☐money order enclosed		TOTAL	

Name _____

Street _____

City _____ **State** _____ **Zip** _____

Please allow six to eight weeks for processing. Thank you.

For further information - Send $2.00 (credited to order)

WATCH FOR:

"GAAMWORKS" -

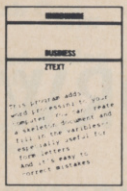
Joystick Ports / Sound / Cartridge Slot

For more information, circle 38 on Reader Service Card.

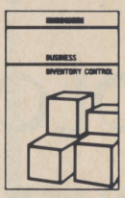
THE MINDWARE LINE OF SOFTWARE FOR TIMEX/SINCLAIR COMPUTERS

MATRIX PLANNER
An all-purpose electronic spreadsheet.
$22.95

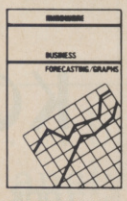
THE FAST ONE
Store, organize and retrieve data instantly.
$24.95



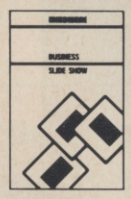
Z-TEXT
A useful word processing program.
$19.95



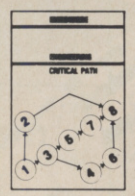
INVENTORY CONTROL
Two ways to keep track of inventories.
$22.95



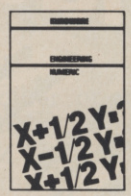
FORECASTING GRAPHS
Analyzes growth trends and plots graphs.
$22.95



SLIDE SHOW
Creates and runs video display shows.
$22.95

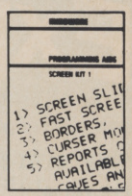


CRITICAL PATH
Gets complex scheduling under control.
$19.95

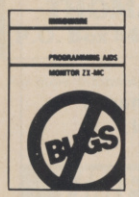


NUMERIC
Solves math formulas and draws graphs.
$24.95

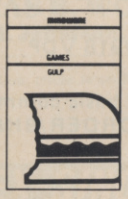
TOOLKIT
Shortcut commands for programmers.
$19.95



SCREEN KIT
Routines to enhance screen displays.
$19.95



MONITOR
Tests and debugs programs in machine code.
$19.95



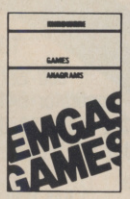
GULP
Gobble your way through mazes, chased by ogres.
$15.95

LABYRINTH
Can you find your way through 3-D corridors?
$15.95

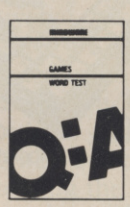
PILOT
Cockpit controls that teach you how to navigate.
$19.95

GRAPHIC GOLF
A challenging 18-hole golf course.
$9.95

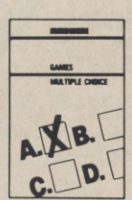
CROSSWORD
Create and play your own crosswords.
$15.95



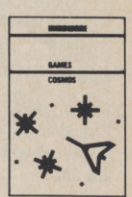
ANAGRAMS
Try to put the scrambled words back in order.
$15.95



WORD TEST
All kinds of question and answer tests.
$15.95



MULTIPLE CHOICE
Can you pick the correct answer?
$15.95



COSMOS
Hyperspace laser battles among the stars!
$15.95

- **FAST LOADING** Mindware's proprietary Quickload™ feature lets you load programs up to four times faster than conventional Timex/Sinclair programs. Quickload software also alerts you to misloads, and lets you restart the tape from the point of interruption, without re-loading from the beginning.
- **QUALITY TITLES** Mindware software is written by top British software developers, including Picturesque, Hewson, Hilderbay, Asher, Campbell, Axis, Jones, Vortex and Silversoft.
- **USER-FRIENDLY** Documentation provides clear instructions, learning examples, and trouble-shooting tips. (All programs require 16K.)

THE ONLY PLAIN PAPER, DOT-MATRIX PRINTER FOR THE TIMEX/SINCLAIR SYSTEM

Mindware's MW-100 gives you the ability to make hard copies of programs, data, mailing lists, and screen graphics.

SPECIAL OFFER: Order a MW-100 printer for $119.00 and get your choice of any two Mindware software titles **FREE**; plus **5 FREE** rolls of paper (comparable retail value, $150-182.00).
Thousands of MW-100's have sold nationally at a retail price of $129.95 (Printer alone).

SOFTWARE ORDER

Title	Price

Postage & handling 2.25
Total
(Mass.residents add 5% tax)

SPECIAL PRINTER OFFER - Retail value, $150-182.00

MW-100 printer - 119.00
Two software titles free: N/C
N/C
Postage & handling 4.95
Total
(Mass. residents add 5% tax)

Total____ enclosed is ☐ check ☐ money order
Charge to ☐ Visa ☐ Mastercard
Number _____
Expiry _____ Signature _____
Please Print
Name _____
Address _____
City/State/Zip _____

Volume discounts available to dealers and schools.
Send more info on:
☐ Quickload software.
☐ MW-100 printer.

SEND TO: Eagle Sales Co./TS
15 Tech Circle Natick, MA 01760
(617) 655-3368

For more information, circle 39 on Reader Service Card.

Inside the T/S1000,ZX81

André Roussil lays bare the T/S1000 to show you Clive's "miracle"

IF you get the chance, look inside an IBM PC. You'll see acres of board covered with countless chips, resistors, capacitors and the like. It all looks very mysterious and impressive. Instead of staring open-mouthed in awe and dreaming wistfully of the day you own one, comfort yourself with the knowledge that your seemingly lowly T/S1000,ZX81 is a superior technological achievement.

Basically, all computers work the same way, so studying the inner components of your T/S1000,ZX81 is an easy way to learn about computer hardware in general.

What makes Clive Sinclair a genius . . .

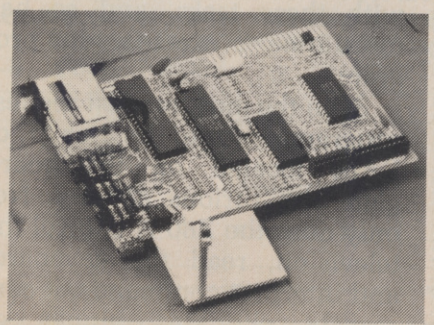
The photographs in this article may not completely satisfy your curiosity, so if you must open your computer, don't use a crowbar; instead, remove the screws under the leg pads with a small Philips screwdriver. Now the mother board is exposed. (I haven't a clue as to why they call it a mother board, and I'm still waiting for father boards and little baby boards to come along.)

You will probably be unimpressed by what you see. Indeed, you may wonder how anything so small and ordinary-looking can function as a computer. What makes Clive Sinclair a genius is that he has managed to squeeze all that computer power into a few miniscule chips that cost very little to manufacture and are easy to test. We as consumers are the winners, getting a unique computer with features otherwise attainable only in higher-priced units.

All computers use the bit as their basic functional unit. A bit is essentially an on/off switch that is permanently set in the ROM (read-only memory) but is switchable in the RAM (random access memory). The ROM switch is maintained in position even when the power is cut-off. The ROM has the memory that tells the computer how to be a computer. In the RAM, when the power is shut off, the switches do not maintain position, hence its memory is lost.

. . . the recognized leader among 8-bit microprocessors . . .

The T/S1000,ZX81 has a ROM chip and a static RAM chip, and various parts on the board that are supportive of these chips. Alone, the RAM and the ROM are just a bunch of bits without purpose; they need an interpreter. A microprocessor is basically a program called a "microprogram", whose function is to organize those memory bits into blocks. These blocks are then interpreted as binary numbers at definable addresses.



Taking a PEEK inside: use a screwdriver, not a crowbar.

The heart of the T/S1000,ZX81 is the Z80 A central processing unit (CPU), the recognized leader among 8-bit microprocessors. Subsequent editions of this chip, such as the Z80 B and C, put 16-bit processors to shame. In choosing this powerful chip, Clive Sinclair has utilized chip technology to the fullest.

The Z80 A is an 8-bit processor because it refers simultaneously to 8 bits in an address. Internally, the Z80 A can deal with up to 16 bits simultaneously on a type of scratch-pad called the register pairs. With 16 bits, you can make a binary number of up to 65553, and this is the maximum number of addresses the Z80 A can form. Sinclair rendered one leg of the chip disfunctional for this purpose, so the actual addressing range is 32768. The processor not only interprets the numbers it finds as data, but also the numbers it finds as instructions. This allows you to copy the contents of certain addresses onto the computer's scratch-pad, test and process these numbers, make logical decisions affecting the computer's next act, and write into addresses.

By organizing 8-bit numbers into a certain order in ROM or RAM, the programmer creates

the "macroprogram" in machine language. The first such program to be installed resides at the beginning of memory and is called the monitor. Many computers have a small permanent program, sufficient to control screens and load full systems into RAMS. The T/S1000,ZX81 has a full monitor system located in a ROM chip.

. . . all roads lead to the Sinclair logic

But the master touch is the chip which holds the Sinclair logic. It acts as an intermediary between the various peripherals and chips, and also selects the memory to be accessed, ROM or RAM. In fact, the other chips need its permission to function. With this switching terminal, Sinclair was able to make a four-chip machine. In the hardware illustration accompanying this article, you can see that all roads lead to the Sinclair logic.

When you power up through the 9-volt entry (located on the side), the current passes through a regulator and is stabilized at 5 volts. Heat from the process is diffused by an aluminium radiator, and escapes through slots in the bottom of the casing. Once on, the microprocessor reads the contents of the first address, then goes through an initialization procedure according to the ROM program. Memory is cleared, parameters set up, and the display file is prepared — a step that starts with a ripple moving down the screen and ends when the cursor finally appears.

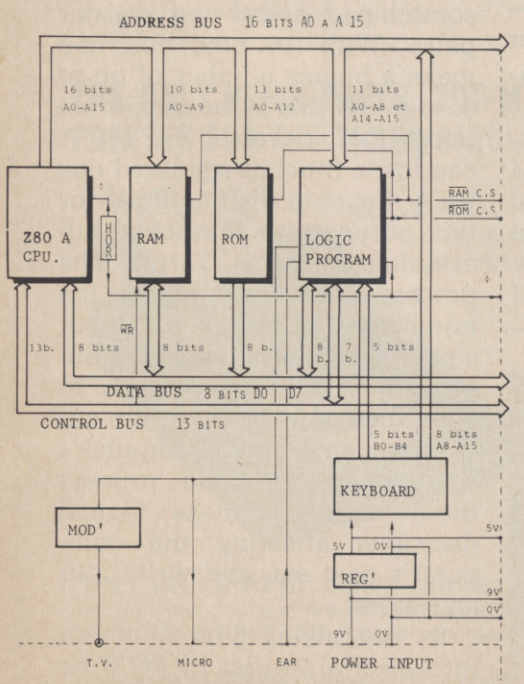
On the circuit board is a connector with a folded plastic strip leading under the keyboard. When you press a key, you cause two metallic strips crisscrossed beneath it to contact with each other, so creating a circuit. By reading these circuits, the processor is able to produce two 8-bit numbers, thereby distinguishing the key pressed as well as the mode the computer was in when the key was pressed. When the computer is in SLOW mode, it reads the keyboard 50 times a second, and maintains the screen image at the same rate. It executes any program in RAM when the screen is blank. In FAST mode, the Z80 A is not preoccupied with these tasks, and so has more time to execute your program.

Even the most modest request programmed into the 1 or 2K of RAM located on the board generates furious activity. Not only does the Z80 A control the television, read the keyboard, and interpret commands, it constantly allocates blocks of memory to take advantage of all available space. Finally, it executes your program, but that turns out to be the least of its worries. With no supplementary RAM attached to the edge connector at the back, the operating system doesn't reserve space for screen prints. It creates space and rearranges in-use memory into suitable locations on the fly. In this way, you get the most from the limited memory of the RAM on the board. (Expansion RAM is available up to 64K.)

Supplementary memory is storage space that frees the program area for Basic and machine language programs. If you consult the memory chart on this page, you will notice a blank space between the addresses 8000 and the 16000. RAM, ROM or EPROM may be situated here, but only machine language can be executed. This space is most suited to expanding the operating system or for cartridge plug-in programs. Maybe Sinclair will decide to do something with this area later. More programs of the same calibre as the present ROM

MEMORY ORGANIZATION OF THE TIMEX SINCLAIR

00000	
ROM	
8192	
8193	
UNCOMMITTED	
16388	
16389	
SYSTEM VARIABLES	
16508	
16509	
PROGRAM AREA	
MAX 32768 . . .	Position can vary
DISPLAY FILE	
. . . . .	Position can vary
VARIABLES	
. . . . .	Position can vary
COMPUTER WORK SPACE	
STACK	RAMTOP



Simplified schematic of the T/S1000,ZX81.

NEW! 7 NEW Handbooks for your Sinclair ZX-81 or Timex-Sinclair 1000!

THE EXPLORER'S GUIDE TO THE ZX-81 AND TIMEX SINCLAIR 1000
by Mike Lord

Here is the first truly advanced guide that will help you use your ZX-81 to its fullest potential. You'll find new features of BASIC, new machine code programming tips and elements of the ROM, 30 games and other programs, application routines, hardware tips, how to add a fullstroke keyboard, and much more!

FIFTY 1K/2K GAMES FOR THE ZX-81 AND TIMEX SINCLAIR 1000
by Alastair Gourlay, James Walsh and Paul Holmes

New! The most complete selection of games ever designed for the Sinclair ZX-81 and Timex 1000 personal computers. By using the programs in this guide, you can play all your favorite arcade games in moments. Dogfight, Breakout, Outlaw, Galaxian, Roadracer, Alien Invasion, and dozens more—all complete in this new game guidebook!

SELF-TEACHING SOFTWARE FOR THE ZX-81 AND TIMEX SINCLAIR 1000
Mathematics I-VI
by Joseph R. Gladstone

Now you can get the learning advantage! Children ages 5-12 will find basic skill instruction and numerous practice programs. Each package contains 2 casette tapes with 32 lessons, games and activities. And ... this newly designed classroom aid comes handsomely packaged in a durable vinyl binder!

MAKING THE MOST OF YOUR ZX-81
by Tim Hartnell

This brand-new handbook focuses on the additional features of your ZX-81.You'll have new games and useful learning tricks, and you'll also see how to write programs that really work! It will guide you through start to finish, using each feature and function of your new ZX-81 personal home computer.

MASTERING MACHINE CODE ON YOUR ZX-81
by Toni Baker

Using this guide you'll learn the ins and outs of ZX machine code translation. Discover the secrets of the ZX-81 ... see how to adapt the code to a ZX-80 machine. When you understand the language translations between BASIC and the ZX machine code, you'll enjoy the workings of your computer to the utmost!

49 EXPLOSIVE GAMES FOR THE ZX-81
Edited by Tim Hartnell

Galactic Intruders, Breakout, Checkers, Death Maze, Smuggler's Mold, and forty-three other favorites are all here, newly adapted for your new ZX-81 personal computer. This fascinating gamebook gives you programming instructions for all 49 marvelous games PLUS complete and easy-to-understand game rules.

THE ZX-81 POCKET BOOK
by Trevor Toms

Now, you can create your own programs and understand why they work. You'll see what your new ZX-81 can do, and what extras will make it able to do even more ... see how to use new ZX-81 BASIC in the best ways ... learn to avoid frustration and retyping with program and data file storage and retrieval techniques. PLUS, you'll learn how to convert your ZX-80 to the advanced ZX-81 capabilities.

Send to: Reston Publishing Company, In care of: Prentice-Hall, Inc., Book Distribution Center, Rte. 59 at Brook Hill Drive, West Nyack, New York 10995.

Please send me my 15-day trial copies of the following titles:

_____ **THE EXPLORER'S GUIDE TO THE ZX-81 AND TIMEX SINCLAIR 1000,** by Mike Lord, (R1815-1), $18.95

_____ **FIFTY 1K/2K GAMES FOR THE ZX-81 AND TIMEX SINCLAIR 1000,** by Alastair Gourlay, James Walsh, and Paul Holmes, (R1979-5), $16.95

* **SELF-TEACHING SOFTWARE FOR THE ZX-81 AND TIMEX SINCLAIR 1000: I-VI,** by Joseph R. Gladstone, **Mathematics 1,** (R6966-7), $29.95_____
Mathematics 2, (R6967-5), $29.95_____ **Mathematics 3,** (R6968-3) $29.95_____
Mathematics 4, (R6970-9), $29.95_____ **Mathematics 5,** (R6971-7, $29.95_____
Mathematics 6, (R6972-5), $29.95_____.

_____ **MASTERING MACHINE CODE ON YOUR ZX-81,** by Toni Baker, (R4262-3), $18.95

_____ **49 EXPLOSIVE GAMES FOR THE ZX-81,** by Tim Hartnell, (R2087-6), $17.95

_____ **MAKING THE MOST OF YOUR ZX-81,** by Tim Hartnell, (R4189-8), $16.95

_____ THE ZX-81 POCKET BOOK, by Trevor Toms, (R9525-8), $18.95

Name _____

Address _____

City _____ State _____ Zip _____

Now you can charge your orders! Visa ☐ Mastercharge ☐

Account No. _____ Expiration Date _____

Signature _____

Save: If check or money order, plus your state's sales tax, accompanies your order, publisher pays all postage and handling charges. Same money back offer applies.
Dept. V. V-0902-9B(4)

For more information, circle 40 on Reader Service Card.

would be most welcome.

There are many peripheral devices available that plug into the edge connector and improve performance. The most notable are printers and push-button keyboards. There is also hardware on the market that works with the ear and mic plugs at the side of the T/S1000,ZX81; they improve the LOAD and SAVE functions involving your cassette recorder. Enough add-ons can make the T/S1000,ZX81 unrecognizable, but that small circuit board with its few unimpressive looking chips is where the action really is.

BASIC PROGRAMS use machine language as an interpreter. In turn, another, more primary language in the microprocessor interprets machine codes. Where does it all stop? Which language did they use to write the microprogram in the CPU? The program must have been written on a computer without a microprocessor, so the first program of all was written directly in binary — one bit at a time. They really had no choice! If your basic program asks for any input at all, then you too have created a language. Chips are just tools that allow various interdependent languages to work together. They are convenient but not absolutely essential to computing.

. . . You sense its potential when you look inside . . .

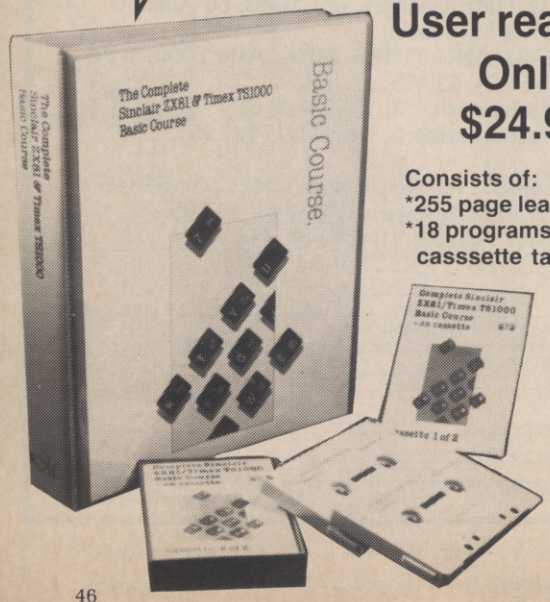
Which chips to use in a computer is a practical question involving financial, technical, and marketing considerations. There is no all-purpose computer. Features you do not find useful in a given system (especially in a small computer system) are just so much wasted power for you. Sinclair could have included any number of specialized chips to increase the features available on his creation. So the T/S1000,ZX81 doesn't come with 200 colors and an assortment of whistles and bells. Neither does the IBM. Though the T/S1000,ZX81 is fun to play with and priced like a toy, it is most definitely no toy. First and foremost, it is a learning tool — with a potential for games and business applications. You sense its potential when you look inside.

The Complete Sinclair ZX81 and Timex Sinclair 1000 BASIC COURSE!

SAVE $5.00

Special Offer to Timex Sinclair User readers! Only $24.95

Consists of:
*255 page learning book
*18 programs on 2 casssette tapes



At last, a comprehensive text for your Sinclair ZX81! The complete BASIC Course is a manual which will immediately become an indespensible work of reference for all your ZX81 programming.

Whether you have never done any programming or whether you are an experienced microcomputer user, the Complete BASIC Course will provide itself to you as an invaluable aid.

The Complete BASIC Course is designed to teach you to write and develop BASIC programs for the Sinclair ZX81 — no other books or aids are necessary. All is revealed in our easy step-by-step guide with programs and "test yourself" exercises all the way through.

As you become more proficient with computing, the Complete BASIC Course will continue to be an essential guide, giving you finger tip references, numerous advanced programming techniques and memory saving devices specifically for the Sinclair ZX81.

NUMEROUS EXAMPLES:
Every concept, every function is fully described by simple programs that you can enter on your Sinclair ZX81 in minutes.
- Home use
- Financial analysis and planning
- Educational applications
- Games
- Mathematical applications
- Displays of Artificial Intelligence

EVERY FUNCTION COVERED:
A full and detailed discussion is included of even traditionally taboo topics such as USR, PEEK and POKE. A handy alphabetical summary section lists all functions, and provides a short description and example programs of all topics.

A PERMANENT WORK OF REFERENCE:
A Complete BASIC Course is an excellent reference work for experienced programmers (including tips on using special techniques) as well as a comprehensive step-by-step guide for complete beginners.

Clip & Mail

Mail order to: Timex Sinclair User, 49 La Salle Ave., Buffalo, N.Y. 14214
Please rush me BASIC COURSE books @ $24.95 ea.

( ) M.O. ( ) Check ( ) Cert. Check
Charge to: ( ) Mastercard ( ) Visa

Card # _____ Expiry Date _____
Shipping add $1.50 for first copy. 50c for each additional copy.
Total $ _____

Name _____
Address _____
City _____ State _____ Zip _____

NOW, A MONTHLY MAGAZINE FOR TIMEX SINCLAIR COMPUTER OWNERS AND USERS.

timex sinclair user

* SPEAK DIRECTLY TO THE 700,000 T/S 1000 OWNERS.
* 50,000 GUARANTEED OWNER-READERS.
* REACH THIS SPECIFIC MARKET EVERY MONTH.
* LARGEST GUARANTEED CIRCULATION IN THE MARKET.

Now there is a way to put your products in front of the 700,000 known owners of the TIMEX SINCLAIR COMPUTER every month. TIMEX SINCLAIR USER MAGAZINE is designed specifically for those owners. Initially, TIMEX SINCLAIR USER guarantees to reach 50,000 T/S 1000 and ZX81 owners monthly. We are the only T/S 1000 specific magazine to publish monthly. We are the only magazine that can present your message to that market 50,000 times every month.

TIMEX SINCLAIR USER is the magazine known owners will use to discover new ideas, new uses, and new products for their T/S 1000, ZX81 computers.

For more information, contact **Hajar Associates,** the national sales reps for **Timex Sinclair User.**

NORTHEAST
280 Hillside Ave.
Needham Heights, Ma. 02194
Bill York, Acct. Executive
617-444-3946

MID-ATLANTIC
321 Broad St.
Red Bank, N.J. 07701
Barbara Best
201-741-7744

SOUTHEAST
Diplomat Building
5400 Diplomat Circle, Suite 205
Orlando, Fla. 32810
Beverly Ellis
305-628-3525

MIDWEST
5225 Old Orchard Rd., Suite 50
Skokie, Ill. 60076
Nancy Sackett
312-966-0160

NORTHWEST
1000 Elwell Court, Suite 124
Palo Alto, Calif. 94303
Pat Murray
415-964-0706

SOUTHWEST
3303 Harbor Blvd., Suite H-4A
Costa Mesa, Calif. 92626
Rae Scot
714-540-3554

timex sinclair user

YOU MARKET T/S 1000 & ZX81 PRODUCTS TIMEX SINCLAIR USER DELIVERS THAT MARKET . . . MONTHLY!

PEGASUS MICRO SYSTEMS

SOFTWARE & HARDWARE ENGINEERS

P.O. BOX 397
CHESTERTOWN, MD 21620
Phone 301-348-5865

	ZX81 & Timex(16K) or Timex 1000	ZX81 or Timex 1000 (48K+)	Timex 2000 (48K) or Sinc.Spect.
(1)	Astro Map & Conversion $9.95	(Expanded) Yes-$14.95	Hi.Res.Vers. Yes-$14.95
(2)	Design List & Other List Programs $9.95	Yes-$14.95	Yes-$14.95
(3)	Savings & Loan Advis.(Amort.&Inv. Counselor) $9.95	Yes-$14.95	Yes-$14.95
(4)	No	No	Music Anth.$14.95
(5)	No	No	Artist'sFriend "
(6)	No	No	Cycloids "
(7)	No	No	Bio-mat "
(8)	No	No	Omnigraph "

Attention software engineers:If you think you have a great program and want the best return on your effort,contact PegasusMicroSystems at above address or call 301-348-5865. We offer 80% of net profits for work done by you only;60% for your work which we help with,and 50% if you head up a team effort. Write or call today.Remember, we also help programmers with their problems as we are programmers!

For more information, circle 55 on Reader Service Card.

SATISFACTION GUARANTEED OR YOUR MONEY BACK

TS-ART

TS-ART helps you **create graphics** on the screen with a pencil, an eraser, about 120 brushes, a video inverser and a "flicker". You can easily move these tools in 8 directions or along lines or circles which are drawn, erased, painted with a brush, video inversed or "flickered". You can set a different background to any quarter of the screen. You can **define new graphic commands** — for example one that "does" a square. Then by pressing only one key you can make any of the tools do a square anywhere on the screen; so a square can be drawn, erased, painted, and so on. And the square can be rotated and it can be compressed or expanded to any size. And it can be used as a building block for other commands you define. And you can save or print the artwork. And . . .

TS-ART is very easy to learn and use, so 4 year old kids master its basic commands in minutes. Yet it is powerful and sophisticated to satisfy the most creative user.

TS-ART is fun; is a screen editor that can mix text with graphics; is a smart **educational device** (ages 4 to 99) that indirectly teaches **(LOGO style)** concepts in arithmetic, geometry and computer science by making abstract ideas visible and concrete.

All this power (and more) for only $12.95 (add $1.50 for s & h in U.S. or $2.50 outside U.S.). 16K RAM.

Win $50 if we use your artwork in our ads.

KSOFT, 845 Wellner Rd., Naperville, IL 60540.

Name _____

Address _____

City/State/Zip _____

[ ] Check [ ] VISA [ ] MC

Card Number _____ Exp. _____

Phone Orders (312) 961-1250

For more information, circle 41 on Reader Service Card.

SYNTAX

SERVING TIMEX-SINCLAIR PERSONAL COMPUTERS

A PUBLICATION OF **THE HARVARD GROUP**

ISSN 0273-2696

SYNTAX is a monthly newsletter exclusively for ZX80/81/TS1000 owners. We bring you news, reviews and applications for your computer, plus technical notes for circuit-builders. SYNTAX also provides a forum for thousands of users to share advice and problems about programs and vendors. We bring you timely updates about new hardware, software and books. And we cover *all* the Sinclair-technology computers, including the new TS1000.

At SYNTAX we emphasize practicality. You can apply our suggestions even if you aren't sure at first why they work, because we give you complete instructions. Text is clear and easy to understand. SYNTAX readers already know about:

- An automatic phone-dialer they can put together in a few hours
- Syntactic Sums™ to check input for errors
- Programs to explore computer memory
- How to build external additional RAM
- How to add an 8212 I/O chip to control external devices from their computers

And SYNTAX readers like what they get every month. Subscribers know they can depend on us.

> *After receiving only three issues of SYNTAX, I find that I anxiously await the next. . . keep up the good work!*
>
> Martin Irons
> Goshen, NY

> *Congratulations on the brass-tacks, down-to-earth approach of your newsletter. I'll be looking forward to future issues.*
>
> Otis Imboden
> Washington, DC

Many readers get their first issue and immediately order the back issues—more proof that they like what they see.

You can see what's special about our publication. We work hard to bring you a quality newsletter. We strive to print useful programs of above-average accuracy. As any computer magazine editor can tell you, program listing accuracy is tough to achieve, but we boost our average with every issue. We test each program to make sure it works, it fits in the designated RAM, and it runs when you follow the directions. We print program listings in screen-image format to make it easier for you (it's sure not easier for us!) to enter program accurately. We invented Syntactic Sum™ as an additional aid for you in getting error-free programs. With your subscription you also get access to thousands of other readers, and our staff experts are available by phone to answer your questions or help you solve problems with your machine.

SYNTAX readers get every month:

- Latest news of Z80 hardware and software
- Programs to organize information, calculate, entertain, or instruct
- Do-it-yourself additions
- Clear explanations for beginners

To share the benefits of SYNTAX, just indicate your choices on the order coupon and return it with your choice of payment in U.S. funds. (Please note that additional postage is required for delivery outside North America.)

We are so sure you'll find SYNTAX useful that we promise to refund your entire subscription fee if you aren't satisfied. An unconditional guarantee—you can't lose.

Join the others who stretch the ZX/TS to the utmost. Act now—as soon as we receive your coupon with payment, your first issue will be on its way. For faster service, phone your credit card order to 617/456-3661. Don't miss SYNTAX!

Fill out the coupon below and mail it to: SYNTAX/**SQ**, RD2 Box 457, Harvard, MA 01451 TSU583

☐ My check is enclosed.
Make checks payable to:
SYNTAX ZX80, Inc.

☐ Please charge my ☐ VISA
☐ Diner's Club ☐ American Express ☐ Mastercard
☐ Carte Blanche account

Account number _____

Exp. date _____ Bank number (MC only) _____

Signature _____

Name _____

Address _____

City _____ State _____ Zip _____

Day phone ( ) _____ Evening phone ( ) _____

☐ This is a renewal. My subscription number is: _____

☐ This is a new subscription.

YES! Please send me:

☐ The Combination (12 issues of SYNTAX and 4 issues of SQ) $39

☐ The Catch-up (SYNTAX Jan. 82-Dec. 83, 4 issues of SQ, plus 1 binder $77

☐ **The Works** (SYNTAX Nov. 80-Nov. 83, 4 issues of SQ, plus 2 binders, a 50% savings) $97

☐ 12 issues of SYNTAX $29

☐ 4 issues of SQ, The Syntax Quarterly $15

☐ 1 Premier Issue of SQ $4.95

☐ 1 Binder ..... $9 ☐ 1 issue of SYNTAX $4

These offers expire 31 Jul 83—SUBSCRIBE NOW.

Fill out the coupon below and mail it to: SYNTAX/**SQ**, RD2 Box 457, Harvard, MA 01451

TSU583

☐ My check is enclosed.
Make checks payable to:
SYNTAX ZX80, Inc.

☐ Please charge my ☐ VISA
☐ Diner's Club ☐ American Express ☐ Mastercard
☐ Carte Blanche account

Account number _____

Exp. date _____ Bank number (MC only) _____

Signature _____

Name _____

Address _____

City _____ State _____ Zip _____

Day phone ( ) _____ Evening phone ( ) _____

☐ This is a renewal. My subscription number is: _____

☐ This is a new subscription.

YES! Please send me:

☐ The Combination (12 issues of SYNTAX and 4 issues of SQ) $39
☐ The Catch-up (SYNTAX Jan. 82-Dec. 83, 4 issues of SQ, plus 1 binder $77
☐ **The Works** (SYNTAX Nov. 80-Nov. 83, 4 issues of SQ, plus 2 binders, a 50% savings) $97
☐ 12 issues of SYNTAX $29
☐ 4 issues of SQ, The Syntax Quarterly $15
☐ 1 Premier Issue of SQ $4.95
☐ 1 Binder .....$9 ☐ 1 issue of SYNTAX $4

These offers expire 31 Jul 83—SUBSCRIBE NOW.

Fill out the coupon below and mail it to: SYNTAX/**SQ**, RD2 Box 457, Harvard, MA 01451

TSU583

☐ My check is enclosed.
Make checks payable to:
SYNTAX ZX80, Inc.

☐ Please charge my ☐ VISA
☐ Diner's Club ☐ American Express ☐ Mastercard
☐ Carte Blanche account

Account number _____

Exp. date _____ Bank number (MC only) _____

Signature _____

Name _____

Address _____

City _____ State _____ Zip _____

Day phone ( ) _____ Evening phone ( ) _____

☐ This is a renewal. My subscription number is: _____

☐ This is a new subscription.

YES! Please send me:

☐ The Combination (12 issues of SYNTAX and 4 issues of SQ) $39
☐ The Catch-up (SYNTAX Jan. 82-Dec. 83, 4 issues of SQ, plus 1 binder $77
☐ **The Works** (SYNTAX Nov. 80-Nov. 83, 4 issues of SQ, plus 2 binders, a 50% savings) $97
☐ 12 issues of SYNTAX $29
☐ 4 issues of SQ, The Syntax Quarterly $15
☐ 1 Premier Issue of SQ $4.95
☐ 1 Binder .....$9 ☐ 1 issue of SYNTAX $4

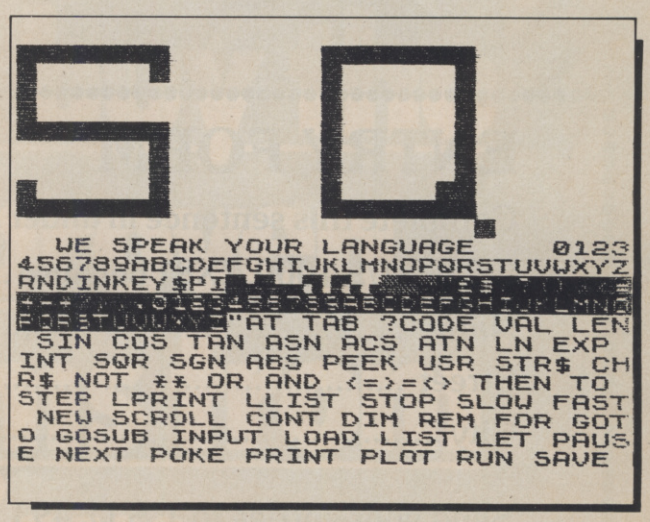
These offers expire 31 Jul 83—SUBSCRIBE NOW.

But we recognized your need for material too long to fit in SYNTAX. Syntax Quarterly fulfills that special need. In-depth, extensive, detailed information—that's what SQ's all about. Long programs, big construction articles, and detailed directions help you use your computer to its fullest while learning.

SQ gives you tested, accurate information that you can depend on. We test, we build, we check everything that goes into SQ. Our staff experts work for you; it's as though your full-time staff prepared a report for you every quarter.

At SQ, we specialize in your machine—Timex-Sinclair technology. Our programs and projects work, and, because we test each one before we publish it, they work on *your* machine. All the information in SQ can work for *you*.

But, to capture these benefits—free software, free plans for hardware, free instruction—you must subscribe. Use the coupon to tell us how to help you best. Or call; we understand people in a hurry. **SQ**


SQ
WE SPEAK YOUR LANGUAGE
SIN COS TAN ASN ACS ATN LN EXP
INT SQR SGN ABS PEEK USR STR$ CH
R$ NOT ** OR AND <=>=<> THEN TO
STEP LPRINT LLIST STOP SLOW FAST
NEW SCROLL CONT DIM REM FOR GOT
O GOSUB INPUT LOAD LIST LET PAUS
E NEXT POKE PRINT PLOT RUN SAVE

617/456-3661

617/456-3661

Please Affix Stamp Here

SQ/SYNTAX
RD 2, Box 457
Harvard, MA 01451

Attn: Subscriptions

Please Affix Stamp Here

SQ/SYNTAX
RD 2, Box 457
Harvard, MA 01451

Attn: Subscriptions

Otis Imboden
Washington, DC

Many readers get their first issue and immediately order the back issues—more proof that they like what they see.

Act now—as soon as we receive your coupon with payment, your first issue will be on its way. For faster service, phone your credit card order to 617/456-3661. Don't miss SYNTAX!

Fill out the coupon below and mail it to: SYNTAX/**SQ**, RD2 Box 457, Harvard, MA 01451 TSU583

☐ My check is enclosed.
Make checks payable to:
SYNTAX ZX80, Inc.

☐ Please charge my ☐ VISA
☐ Diner's Club ☐ American Express ☐ Mastercard
☐ Carte Blanche account

Account number _____

Exp. date _____ Bank number (MC only) _____

Signature _____

Name _____

Address _____

City _____ State _____ Zip _____

Day phone ( ) _____ Evening phone ( ) _____

☐ This is a renewal. My subscription number is: _____

☐ This is a new subscription.

YES! Please send me:

☐ The Combination (12 issues of SYNTAX and 4 issues of SQ) $39
☐ The Catch-up (SYNTAX Jan. 82-Dec. 83, 4 issues of SQ, plus 1 binder $77
☐ **The Works** (SYNTAX Nov. 80-Nov. 83, 4 issues of SQ, plus 2 binders, a 50% savings) $97
☐ 12 issues of SYNTAX $29
☐ 4 issues of SQ, The Syntax Quarterly $15
☐ 1 Premier Issue of SQ $4.95
☐ 1 Binder ..... $9 ☐ 1 issue of SYNTAX $4

These offers expire 31 Jul 83—SUBSCRIBE NOW.

SQ **SYNTAX QUARTERLY**
by The Harvard Group

Increase Your Computer's Utility With Our Help

You own a powerful computer, capable of sorting, analyzing, calculating, displaying and manipulating data as well as measuring and controlling. Despite its small size, your computer will help you learn, analyze your business, keep your records or your schedule, dial your phone, send messages, or talk to other computers. To control the power available to you, you'll need hardware and software to use with your machine. Although you can buy many of these products—and we'll tell you about them—some you must create or modify for yourself. SQ will provide you with the complete information to let you use your programming or tinkering time efficiently.

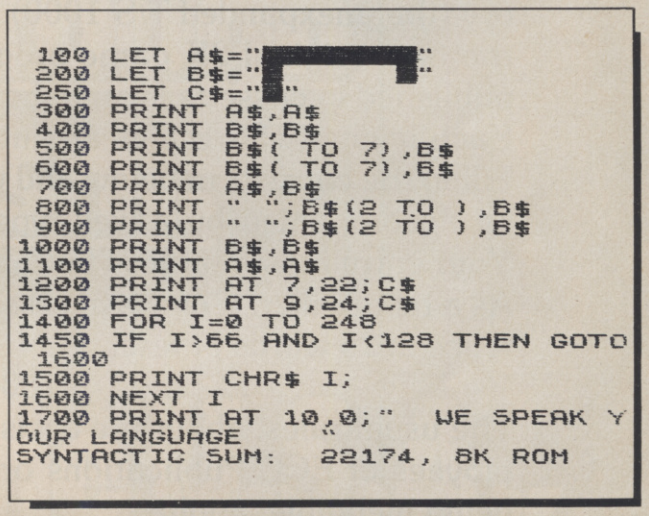
Our experts also bring you SYNTAX, the newsletter, for up-to-date, concise information. You need news and new product announcements quickly. And SYNTAX packs a lot of information into its brief, time-saving format.

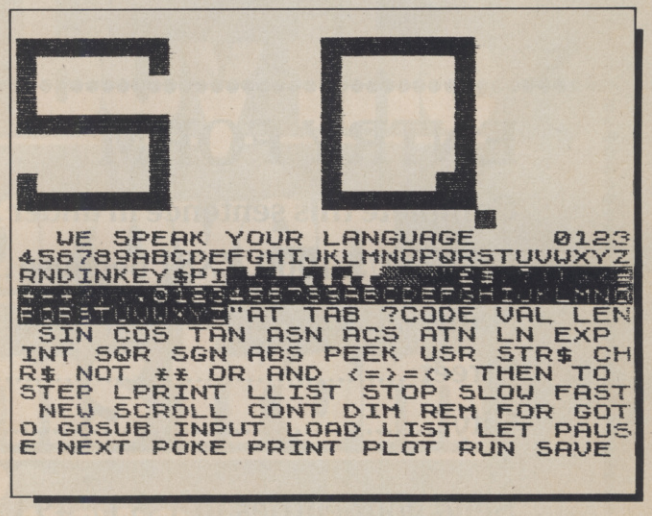
But we recognized your need for material too long to fit in SYNTAX. Syntax Quarterly fulfills that special need. In-depth, extensive, detailed information—that's what SQ's all about. Long programs, big construction articles, and detailed directions help you use your computer to its fullest while learning.

SQ gives you tested, accurate information that you can depend on. We test, we build, we check everything that goes into SQ. Our staff experts work for you; it's as though your full-time staff prepared a report for you every quarter.

At SQ, we specialize in your machine—Timex-Sinclair technology. Our programs and projects work, and, because we test each one before we publish it, they work on *your* machine. All the information in SQ can work for *you*.

But, to capture these benefits—free software, free plans for hardware, free instruction—you must subscribe. Use the coupon to tell us how to help you best. Or call; we understand people in a hurry. **SQ**


100 LET A$="
200 LET B$="
250 LET C$="
300 PRINT A$,A$
400 PRINT B$,B$
500 PRINT B$(TO 7),B$
600 PRINT B$(TO 7),B$
700 PRINT A$,B$
800 PRINT " ";B$(2 TO),B$
900 PRINT " ";B$(2 TO),B$
1000 PRINT B$,B$
1100 PRINT A$,A$
1200 PRINT AT 7,22;C$
1300 PRINT AT 9,24;C$
1400 FOR I=0 TO 248
1450 IF I>66 AND I<128 THEN GOTO 1600
1500 PRINT CHR$ I;
1600 NEXT I
1700 PRINT AT 10,0;" WE SPEAK YOUR LANGUAGE "
SYNTACTIC SUM: 22174, 8K ROM


SQ
WE SPEAK YOUR LANGUAGE
0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZ
RNDINKEY$PI
"AT TAB ?CODE VAL LEN
SIN COS TAN ASN ACS ATN LN EXP
INT SQR SGN ABS PEEK USR STR$ CHR$ NOT ** OR AND <=><> THEN TO
STEP LPRINT LLIST STOP SLOW FAST
NEW SCROLL CONT DIM REM FOR GOTO GOSUB INPUT LOAD LIST LET PAUSE NEXT POKE PRINT PLOT RUN SAVE

617/456-3661

617/456-3661

Contest

Write a 2K program and become an INSTANT AUTHOR ! 10 WINNERS

Welcome to Timex Sinclair User and our first of a series of competitions which we hope will help you to enjoy your computer more. In this first contest, as we want to include all the readers with only 2K of memory (the unexpanded T/S 1000), the winners will be those who submit the best original 2K game program. Every winner's program will be published in cassette form to be sold internationally.

Each winner will receive an author's contract and earn top royalties. Fill in the entry form below and while we will accept a cassette; it must be accompanied by a well-typed or beautifully hand-written listing. Your entry must reach us by June 10.

As a tie breaker, if one is necessary, we want you to complete this sentence in 25 words or less:

I ♡ my T/S 1000, ZX81 because .....

The usual rules, about the decisions of the editors being final and employees of ECC Publications or International Publishing & Software being ineligible, apply.

ENTRY FORM

Complete this sentence in under 25 words. It will be used as a tie-break:

I ♡ my T/S 1000, ZX81 because .....

Name .....

Street .....

City ..... State .....Zip .....

Send your entries to T.S.U, 49 La Salle Avenue, Buffalo, N.Y. 14214 to arrive not later than June 10. No submissions can be returned.

In the U.K., home of the world's best-selling computer, you'd buy through Prism.

Now, in the U.S.A., you can buy the best-proven programs from Prism...

Available now! Spread-sheet plann challenging games, edu

Over a million people world-wide have bought a Timex Sinclair personal computer, and every month the figure grows.

And it's true of any serious computer that 'the software makes the system'.

So, what better software to buy than Prism software? As Exclusive Trade Distributors for the Sinclair range of computers, peripherals and software in the U.K., Prism in-depth knowledge and experience is unrivalled.

With a significant reputation to maintain, you can be sure Prism software has been thoroughly 'field-proven'.

Spread-sheet planner, word processing, challenging games, educational programs . . . now they're all available to you in North America.

They give you even more scope with your TS1000, and allow you to use your computer immediately*.

This easy-to-use software is even easier to order! Complete and mail the coupon opposite for the programs of your choice — today.

**16K programs require 16K RAM memory pack.*

ADVENTURE

A1. Samurai Warrior — A game where, as a Samurai warrior, you battle with other Samurai and with bandits to protect villages. Can you become Shogun? (16K)

A2. Tyrant of Athens — Disasters, famines, attacks from land and sea. Can you resist them all and remain Lord of Athens? (16K)

A3. Roman Empire — Send legions to conquer Mediterranean countries — and if you succeed, crown yourself Caesar! (16K)

A4. Peloponnesian — A re-enactment of the famous battles between Athens and Sparta. Try to win allies and influence people before the final battle! (16K)

A5. Warlord — You'll need swift judgement to protect your village from marauding bandits and Samurai, your fleet from pirates, and your people from slavery. (16K)

A6. Escape From Manhatten — MAY DAY . . . MAY DAY . . . The President's plane has crashed, on an island of convicts! Get there! Get him! Then get out again! (16K)

A7. Demon Adventure — Standard-text adventure game with real-time battles and which relies on complexity rather than difficulty of play. (16K)

A8. The Thing — A graphic adventure game set in the Antartic. Escape to the helicopter and save your life — if you can. (16K)

ARCADE ACTION

R1. J.D. Arcades — Three popular m/code games with some novel twists. (16K)

R2. Outrider — Save your mother ship. She's being assailed by aliens! (16K)

R3. Xaraks — Get round the maze without

All designed to let you most from your TS100

ning, word processing, ducational programs...

the guard catching you. And if you want to make things difficult for yourself, there are nine levels of play, all m/code. (16K)

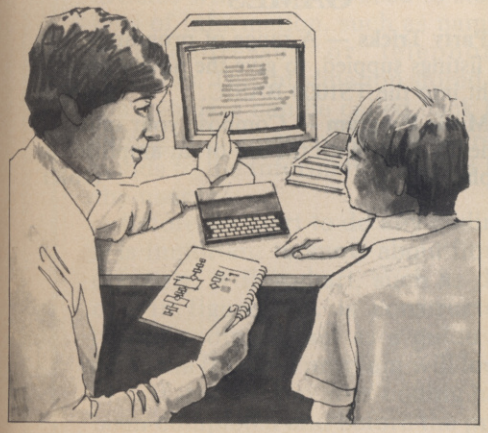
R4. Avenger — A classic. Can you win the planet? Destroy oncoming missiles, bombs, and the city below to stake your claim. (16K)

R5. Protector — Defend your ship against oncoming missiles. Can you create the highest-ever score? (16K)

R6. Bomber — You must land, but not before all alien life forms are neutralized . . . but they want to neutralize you! (16K)

R7. Alien Rain — There's an Extra Terrestrial on one side of the screen, and you're on the other. It's raining — bombs! Please try and rescue the Extra-Terrestrial. (16K)

Program listing continued overleaf!



get the 0...Now!

Now order your TS1000 programs direct from Prism— the TS1000 experts . . .

Adventure
- ☐ *A1. Samurai Warrior* .. $9.95
- ☐ *A2. Tyrant of Athens* .. $9.95
- ☐ *A3. Roman Empire* $9.95
- ☐ *A4. Peloponnesian* $9.95
- ☐ *A5. Warlord* $9.95
- ☐ *A6. Escape From Manhatten* $14.95
- ☐ *A7. Demon Adventure* . $9.95
- ☐ *A8. The Thing* $9.95

Arcade Action
- ☐ *R1. F.D. Arcades* $9.95
- ☐ *R2. Outrider* $9.95
- ☐ *R3. Xaraks* $9.95
- ☐ *R4. Avenger* $9.95
- ☐ *R5. Protector* $9.95
- ☐ *R6. Bomber* $9.95
- ☐ *R7. Alien Rain* $9.95

Business
- ☐ *B1. Word Processor* .. $19.95
- ☐ *B3. Trawler* $9.95

Challenge
- ☐ *C1. Video Map* $9.95
- ☐ *C2. Golf* $9.95
- ☐ *C3. Pilot* $9.95

Computer
- ☐ *P1. Hi-Res Package* .. $19.95
- ☐ *P2. Video Graph* $14.95
- ☐ *P3. Video Sketch* $14.95

Games
- ☐ *G1. Party Tricks* $9.95
- ☐ *G2. Music Program* $9.95

Total	
Postage & Handling $1.50 per item ($84.00 maximum)	
N.Y. Residents add 7% Sales Tax	
TOTAL ORDER VALUE	

☐ Check ☐ Mastercard ☐ Visa ☐ Money Order

Card No. _____ Exp. date _____

Cardholder's signature _____

Name _____

Address _____

City _____ State _____ Zip _____

Please allow 4-6 weeks for delivery.

Please send coupon with payment to:
PRISM MICROPRODUCTS
49 La Salle Avenue
Buffalo, N.Y.. 14214

Prism Microproducts are published and distributed in North America by International Publishing & Software Inc.

PRISM MICROPRODUCTS

Order your TS 1000 programs today - direct from Prism, the TS1000 experts.

TS1000 programs

Complete the details on the other side of this coupon and send with payment to:

PRISM MICROPRODUCTS INC.
49 La Salle Avenue
Buffalo, N.Y. 14217

BUSINESS

B1. Word Processor — Use your TS1000 to familiarise yourself with word processing. If you have a printer, prepare a letter to your friends. (16K)

B2. The Spread-sheet — Prepare forecasts, budgets, projections and models. This spread-sheet planner for the TS1000 brings professional computer techniques within everyone's reach. (16K)

B3. Trawler — A business-management game set in the North Sea. Can you match the catch of a top trawler captain? (16K)

CHALLENGE

C1. Video Map — Navigate your plane cross-country. Sounds easy? If you go off course . . . (16K)

C2. Golf — Play your game of golf in the comfort of your own home! But don't be deceived — you still have to deal with sand, rough, trees, etc. (16K)

C3. Pilot — That's you. Can you land your plane safely in the dark? (16K)

COMPUTING

P1. Hi-Res Package — Greatly enhances the graphics facilities of your TS1000, increasing the resolution to 256 x 192. (16K)

P2. Video Graph — Despite the name this one doesn't plot graphs! Instead, this fascinating program enables you to create pictures which can be stored, and then merged — like an Identikit. (16K)

P3. Video Sketch — Use the full graphics facilities of the TS1000 — draw, type, use the large alphabet and reverse images. (16K)

GAMES

G1. Party Tricks — A range of programs with listings suppied, to give the novice an insight into the TS1000 BASIC. (1K)

G2. Music Program — Compose your music on the TS1000. With the aid of an amplifier it can play for you (16K)

PRISM MICROPRODUCTS

PRISM MICROPRODUCTS INC.
49 La Salle Avenue
Buffalo, N.Y. 14217

For more information, circle 43 on Reader Service Card.

Let the structure flow and you are well on the way

Part one of our step by step guide to help turn every one of you users out there into expert programmers. By John Gilbert.

ANY PROGRAMS written by beginners to computing show a lack of what professionals call structure. The structure of a program is the way in which it is put together and the order in which the code — the language in which it is written — is put down in the finished product.

This series will show the beginner how to structure programs so that they will work faster and occupy less memory. As an example of how the techniques work, a database will be constructed in the articles which can be used to store lists of information, such as names and addresses or telephone numbers. The information stored in the database can be called back by typing in a keyword which corresponds to the information sought by the user.

Before we start to do any coding it is important to know about flowcharting. A flowchart, such as the one in figure one, is constructed before coding to act as a guide to what the finished program will look like. If it is written after coding has been completed and before the programmer starts to search for errors — to debug the program — it will be an aid in finding redundant code or code which inhibits the flow of a program.

The program flow is the way in which the program will be executed. It is important to have that correct or errors will continue to occur on the program and the speed of the program will be slower.

The basic flowcharting symbols are the Input/Output box, operation rectangle and decision diamond and an example of each is shown in figure one.

The I/O box is used to mark places where an entry is made by the computer operator, or when the computer displays data on a screen or printer. The box can be used for all forms of input including keyboard, joystick, or even punched cards on a large mainframe computer.

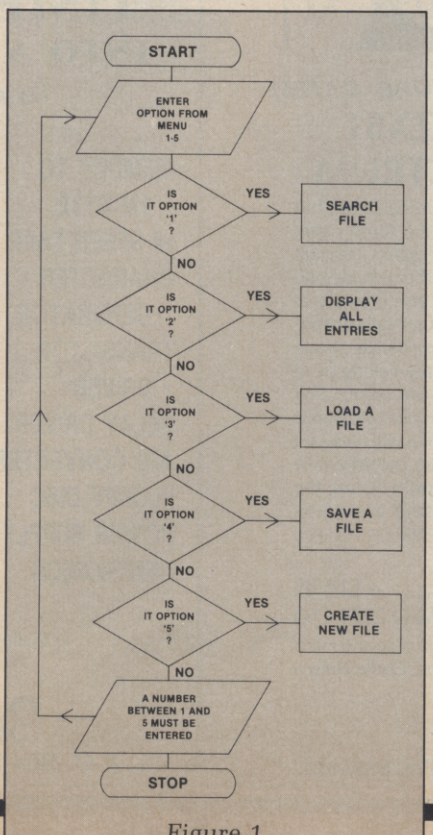


Figure 1

When debugging a program, checks for errors should first be made at those junctions in the flowchart as the boxes mark places where a user can crash a program by entering the incorrect information.

The decision diamond is the most complex operation box in a computer flowchart — and the most necessary. A computer is distinguished from other machines through its ability to make decisions based on information. Usually the processing of that information will provide a simple yes or no answer. The inflow to the diamond descends vertically and splits in two to provide the yes/no options.

The option which contradicts the program flow goes out to the side of the box and can be directed up, to form a loop until the action has been performed correctly, or down if alternative action is required to that of the normal flow.

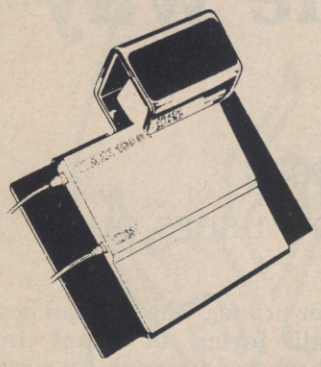
Finally, the operation rectangle is used to show that the computer has to perform some kind of calculation. That may be adding numbers, assigning numbers to variables, or scanning a string of characters. The use of that and the other boxes is illustrated in figure one.

Flowcharts usually are constructed before writing a program but it is a good idea to draw up one

TIMEX 1000 COMPUTER
* OWNERS *

IF YOU OWN A 16K RAM MODULE
THEN YOU NEED A "CRASH GUARD"
TO HELP SOLVE YOUR WOBBLE AND CRASH PROBLEMS

* NO DANGER BUMPING THE MODULE
* PROVIDES A SOLID WORK BASE
* MADE OF HEAVY GUAGE ACRYLIC



$19.95
ADD
$2.00 S. & H.

VISA OR MASTER CARD ACCEPTED

EXPENSE CUTTERS PRODUCTS, INC.
P.O. BOX 9543 RAYTOWN, MO 64133
(816) 353-1690

10 DAY TRIAL PERIOD
"SATISFACTION GUARANTEED"

For more information, circle 44 on Reader Service Card.

DON'T MISS THIS INCREDIBLE OFFER!

50 GAMES

$19.95 on cassette for all the following:

TIMEX
sinclair ZX81
TI 1000
SPECTRUM
TI 2000

Also available for
ATARI 400/800
VIC 20
apple (ON DISC & CASSETTE)

YES, 50 GAMES!
FOR YOUR MICRO-COMPUTER

GALACTIC ATTACK	MAZE EATER	SUBMARINES	
SPACE MISSION	ORBITTER	ROCKET LAUNCH	
LUNAR LANDER	MOTORWAY	PLANETS	
PLASMA BOLT	FORCE FIELD	BLACK HOLE	
STARTREK	NIM	DYNAMITE	
RADAR LANDING	TUNNEL ESCAPE	DO YOUR SUMS	
ATTACKER	BARREL JUMP	DERBY DASH	
GALACTIC DOGFIGHT	CANNONBALL BATTLE	SPACE SEARCH	
ZION ATTACK	OVERTAKE	UNIVERSE	
IVASIVE ACTION	SITTING TARGET	RATS	
OXO	SMASH THE WINDOWS	TANKER	
BOGGLES	SPACE SHIP	PARACHUTE	
PONTOON	JET FLIGHT	JETMOBILE	
SKI JUMP	PHASER	HIGH RISE	
HANGMAN	INTRUDER	THE FORCE	
OLD BONES	INFERNO	EXCHANGE	
THIN ICE	GHOSTS		

only $19.95

Mail order direct to: –
CASCADE SOFTWARE 37 Fruehauf Street Buffalo, N.Y. 14226

MINIMUM SIZE COMPUTER REQUIRED ONLY

SUPPLY CASSETTE 50 FOR _____ COMPUTER

I enclose a cheque/P.O. _____
Name _____
Address _____
_____
Zip Code _____

ORDER NOW!

For more information, circle 47 on Reader Service Card.

THE TOMB OF DRACULA!

3D HORROR ADVENTURE GAME!
FOR THE **16K TS1000/ZX81**
OR **48K TS2000/SPECTRUM**

A superb 3D graphics adventure game! **Enter** Dracula's tomb at 30 minutes to sunset . . . **wander** through the tomb's pre-mapped 300 vaults in search of the fabled Vampire's Treasure . . . **pick up** valuable silver stakes and use them to defend yourself against the lurking horrors . . . ghouls, zombies, pits of primaeval slime . . . **See** them all on the computer's plan of the tomb . . . when it will let you! **Take** a chance on a Mystery Vault . . . if you dare! And all the time the minutes are ticking by to sunset . . . when **Dracula** rises from his coffin and comes after **you**! Each of the infinite levels of the tomb has its own 300 vaults . . . go as deep as you like, the Prince of Darkness will seek you out in his blood-lust! **WARNING: people of an exceptionally nervous disposition should play this game only during the hours of daylight**! Special facility lets you save a game in progress onto tape so you can continue it whenever you choose.

For TS1000/ZX81 with 16K RAM $14.95
For TS2000/SPECTRUM with 48K RAM.....$14.95

Price includes ready-to-load cassette with library case and inlay, full instructions, **AIRMAIL** postage and packing. **Order today**! Money refunded if not delighted!

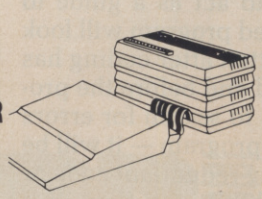
Send cash or cheque to:
FELIX SOFTWARE (DEPT. SSU1)
19 Leighton Avenue, Pinner, HA5 3BW, England.

For more information, circle 46 on Reader Service Card.

WANT TO BUILD YOUR LITTLE TIMEX/SINCLAIR INTO A REAL COMPUTER?

Try our plug-together systems.

MEMORY TO 1M BYTE
HI SPEED TAPE
CHARACTER GENERATOR
TRANSISTOR DRIVER
RELAY DRIVER
A/D CONVERTER
FLOPPY DISC
POWER SUPPLY
CENTRONICS



SOFTWARE
KEYBOARDS
I/O PORTS
SWITCHES
CONTROLS
JOYSTICKS
HI RES
EPROM
SPEECH
RS 232
PRINTERS

Dealer Inquiries Invited.
Catalog—U.S. Free, $1.00 Outside U.S.

Sinclair Place
P.O. Box 2288A • Redmond, WA 98052

For more information, circle 45 on Reader Service Card.

from the finished program to see if the program flows as it was originally intended.

When drawing a chart the boxes should be balanced as much as possible to the left and right of the main stem of the flow. The whole point of flowcharting is to create an easily understood diagram. The labels inside the symbols should be written in English and not in Basic.

The diagram in figure one uses several decision diamonds and they branch to both left and right. A flow on just one side of the diagram looks sloppy if there are more than two decisions to be made.

The way not to structure a flowchart is shown in figure two. The flow lines at the side have been run together, making it almost impossible to decide what happens next. That is remedied easily by making the chart longer and restructuring the lines into separate boxes as shown in figure three.

When writing a program it is a good idea to draw several flow diagrams. The first would be an overall plan showing the sections of program to be written and subsequent diagrams would expand each box to show the flow of the various routines.

A program is structured in a similar way to a flowchart. Most programs are constructed in the way figure one shows. The technique is called modular programming because the structure is broken into subroutines, or sections, called modules.

The reason is to eliminate as many GOTO statements as possible, or to make a GOTO statement jump only to a part of the routine in which it is situated, i.e., to make what is termed a local jump, or the control routine at the top of the program.

The control routine consists of a series of GOSUBs. It is the part of the program which is used most so it is the first thing that the computer encounters when scanning the program. In that way the program is faster in execution so it becomes more efficient.

A control routine can have two distinct structures. The first is used in a game-type program. That type of program will execute routines by going down through each of the GOSUBs in turn and then returning to the beginning.

The other type of structure is that which we shall use for the database. The program will first jump to the menu routine where the user will select an option. Control is then sent back to the control routine and using a series of IF . . ., THEN statements, the program will go to the subroutine selected by the player. The control program will not go down through all the GOSUBs but jump only to those specified by the user through the menu.

The database will function using a keyboard recognition function. The user enters a few words which act as a key phrase. The program will then look through the list, or file, of information in the program and, if a match is made between the key phrase and part of a piece of information, that piece of information will be output. The computer will output all information which is associated with the key phrase.

The program will also have to support separate data files and be user-friendly so that anyone can use it. The program menu will have search files, and create new files. The program structure will look like this from top to bottom, with the control routine at the top.

The complete flowchart of the database is shown in figure one. Using that chart it will be easy to translate each operation into program code.

Next month I will show how the overall structure of the program is finalized and then we can start coding.

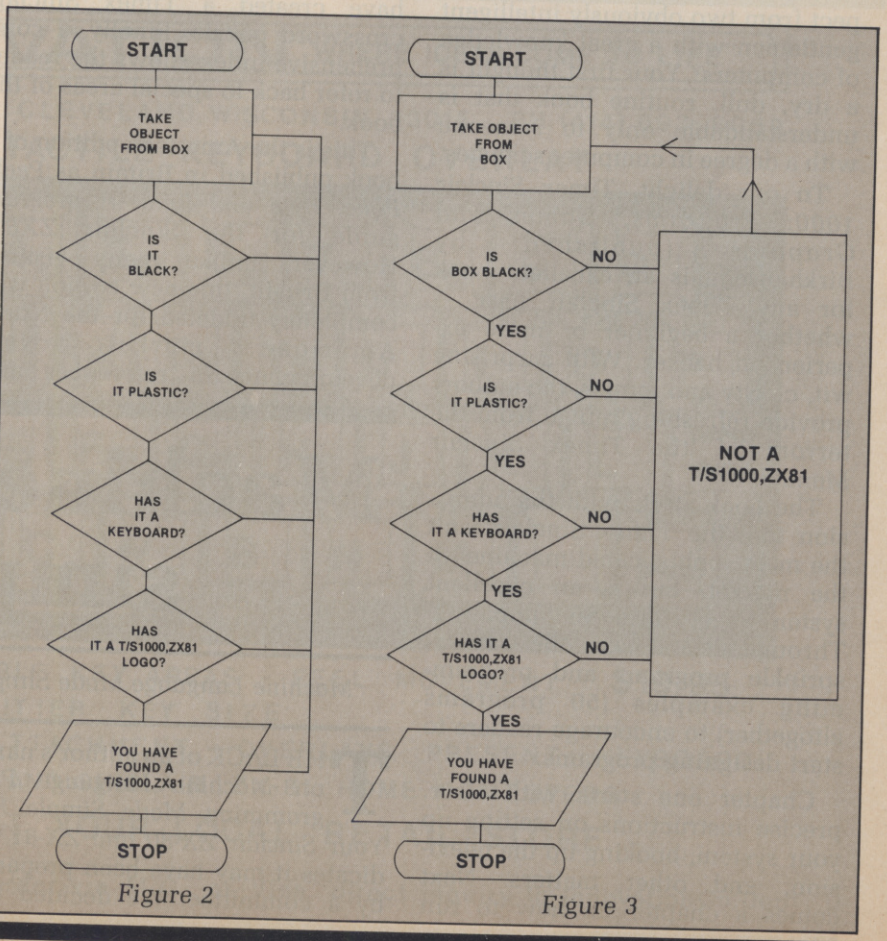
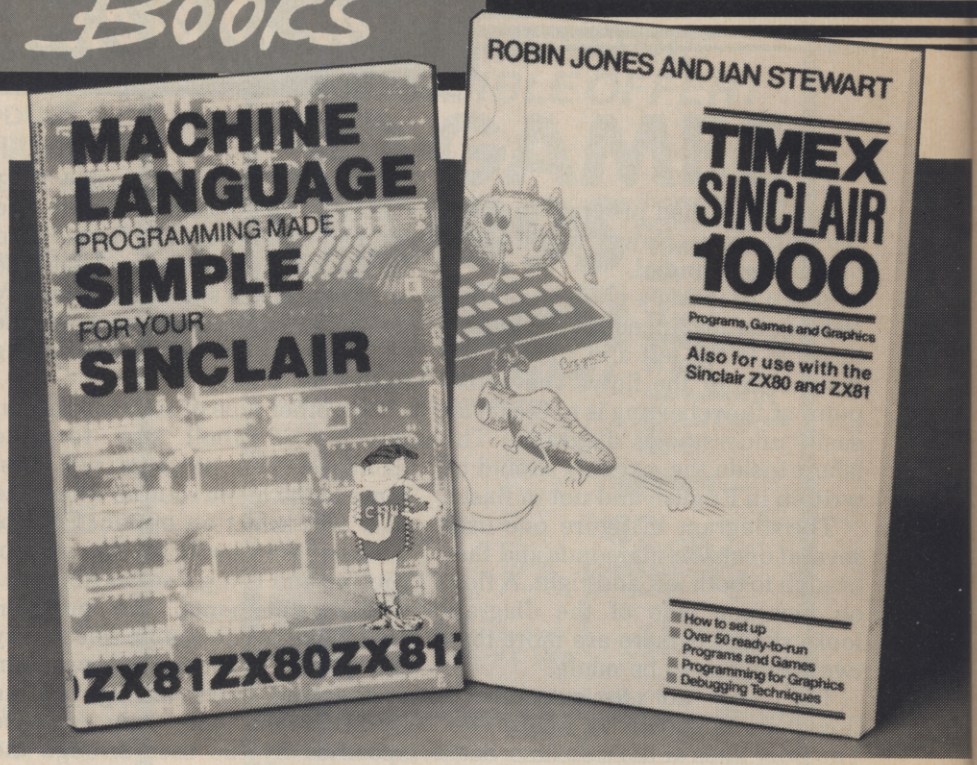


Figure 2

Figure 3



This book is clear, witty, useful

Timex Sinclair 1000: Programs, Games and Graphics

PROFESSOR Ian Stewart is with the University of Warwick, England, while co-author Robin Jones is with the computer unit at the South Kent College of Technology, England.

What kind of a book can we expect from two obviously intelligent gentlemen with a great knowledge of computers? Your first thought is a dry, dull, routine book that is understandable only to someone with a degree in computer sciences.

To our delight, *Timex Sinclair 1000: Programs, Games and Graphics* (published by Birkhausen), is an excellent book for any Timex Sinclair user — whether a beginner or more experienced hacker. With surprising wit, clarity and humor, the authors provide refreshing refuge from the terrors of the *Timex Sinclair Manual.*

The book starts with the admission that the Timex Sinclair isn't the most sophisticated machine on the market, but is an excellent system to get started in computing. Throughout the text, the authors sprinkle programs and programming examples (50 programs altogether) to encourage readers to start designing programs.

Chapter one starts with clear, precise instructions on setting up your system, hooking up the television, and other matters. Next comes a chapter on how to run prepackaged programs, the basics of BASIC, arithmetic, and a chapter entitled: "Heeeellllppp!"

To break up continuity in the middle of the book, the authors have created a Timex Sinclair crossword puzzle. Finally, a comprehensive index allows the reader to refer back to special areas of the book.

This is the American edition of a book published in Britain as *Peek, Poke, Byte and Ram: A program guide for the Sinclair ZX81.* However, unlike many visitors from Britain, this new edition was completely updated for the North American market. New developments in references and changes in Timex Sinclair technology were included in the revised edition.

The book is well designed, and contains excellent information for anyone digging into a Timex Sinclair computer system. Although we have not run the programs, the authors' titles indicate some fascinating possibilities. They include: Drunkard, Sink the Bismarck, Monopoly, Dice, Billiard Bounce, Macy's, Molehunt, Fruit Machine, Sinecurve, Brickbat and Linette (roulette played in a straight line).

Buy it! *Timex Sinclair 1000* will make a useful addition to your Timex Sinclair library.

Machine language simplified

Machine Language Made Simple For Your Sinclair ZX80 and ZX81

THE LACK of an author's name on *Machine Language Programming Made Simple For Your Sinclair ZX-80 and ZX-81* indicates it may have been prepared by a committee. We decided the author was probably a comic art character used throughout the book to enliven the text. Dressed in a court jester's outfit, wearing a CPU chip T-shirt, the arty little character is helpful for the reader. The jester

Books

frowns, smiles or looks confused to indicate the density of the text.

A disturbing number of typographical errors are sprinkled through the text. This is probably a result of the book being printed in Hong Kong, where proofreaders are not known for their mastery of English. However, these typos are so apparent that their presence should not keep you from purchasing the book.

The authors (or committee) get off to a good start in the first chapter with listings of advantages and disadvantages of machine language programming. The chapter ends with an excellent sentence summarizing machine language programming:

"It's hard, it's frustrating, it's inconvenient, but it's a wonderful practice and gives you a great insight into the way computers work."

The book is written for the typical ZX81 or Timex 1000 user — someone with limited experience with a computer system. Next, the function of the CPU is explained, followed by information on computer counting and numbering systems used in machine coding, both binary and hexadecimal (HEX).

One problem with the book is the term "location." Sometimes this is referred to as a single byte of memory having 8 bits, or as the address (which is two bytes, 16 bits) of the data base.

". . . in Hong Kong, proofreaders are not known for their mastery of English . . ."

Next, the court jester shows how data is manipulated, using his hands, feet, fingers and boxes for storage. Then, the ZX80 instruction set is introduced in about a dozen groups containing several short program routines.

The final third of the 160-page book concerns programming in machine code and how it can be loaded into the ZX80, ZX81 and Timex 1000. For short routines hand assembly could be used. However, the longer routines would need an assembler-editor program to do the major coding.

The lengthy program at the end of the book is called "Checkers " in the United States and Canada, and "Draughts" in England.

The utility of the book is diminished by lack of a comprehensive index. Perhaps after a thorough study of the contents, a reader will know where to look for help with a specific program. Published by Melbourne House.

Books reviewed by Warren Smith and Harry Petheram

INNOVATION "WHERE IDEAS COME TO LIFE"

16529 LAKESHORE ROAD CLEVELAND, WISCONSIN 53015 PH. (414) 693-8062

EXCLUSIVE TACTILE KEYBOARD OVERLAY

- RAISED DEPRESSABLE KEY AREAS - FEEL MOVEMENT $19.95
- STANDARD TYPEWRITTER KEY SIZE
- EASY CUSTOMER ATTACHMENT - OVERLAYS PRESENT KEYBOARD OF THE TIMEX 1000 AND SINCLAIR ZX-81 HOME COMPUTERS

CONSULT YOUR LOCAL RETAIL STORE

For further information or mail order via M.C. or Visa direct inquiry to Innovation Co. Dept. U

For more information, circle 48 on Reader Service Card.

Follow our golden rules for

Programming on the T/S1000,ZX81 can be frustrating. These 10 tips should help you get over some of the problems! For our first issue of Timex Sinclair User, we went to dealers, publishers and users for the most often asked questions about the T/S1000,ZX81. These questions and our answers are the contents of this column this month. For future issues, we will rely on you, the reader/user, to fill this space with your letters, questions and comments.

1

WATCH YOUR LEADS

THERE ARE two leads that join your tape recorder to the computer. One is used for saving programs, the other for loading. When you save or load a program, unplug the lead that you are not using. This prevents a feedback loop from forming with the computer which could cause corrupted saves and unsuccessful loads.

2

CLEAN TAPE RECORDER HEADS

ANY DIRT or residual magnetic field on the heads of your tape recorder could cause a corrupted save or load. It is important that you clean and demagnetize the heads on your tape recorder regularly. There are many good commercial cleaning kits on the market.

3

SAFE SAVES

ON MOST blank cassettes, there is a length of leader (non-usable tape) at the beginning. Wind the tape in the cassette past this leader. Turn the cassette forward until you can see recording tape (brown) before you start a save. This will insure that your save will start on recording tape and not on the leader nor on the join between the tape and the leader.

4

1K & 2K LOADS

IF YOU are experiencing difficulties loading 1K or 2K programs, try this. Remove the 16K RAM pack and try again. We agree that it shouldn't matter, but we have found that it often does . . . so give it a try!

better SAVEs and LOADs

5

OUTSIDE PROBLEMS

THE TS1000 and the ZX81 computers are easily affected by outside electrical interference. It is best, if you can, to set your machine up away from any large electrical appliance. Also, it is recommended that you not work on a metal table.

6

VOLUME SETTINGS ARE IMPORTANT

MOST TS1000 ZX81 users develop a mania for using one special "old reliable" tape recorder and one perfect volume setting to get consistently good loads and saves. We found that getting our machine to work well depended upon the time of day, the weather, the mood of the user, or whatever struck the machine's fancy. One factor that did help though, was adjusting the volume on the tape recorder. We suggest that you start at about ¾ volume and adjust it up or down until you find a comfortable setting for you and your machine. If you have a tone control, adjust it to full treble.

7

CLEARER TV PICTURE

OFTEN the computer is hooked up to the TV through a switch. Using a switch is convenient, but it may cause lines or fuzziness to appear on the screen. For a clearer TV picture, attach the TV lead from the computer directly to the U.H.F. or V.H.F. screws on the back of the set. First strip the end of the lead, making sure that the two wires that you find do not touch. Attach these two wires to the screws on the back of your TV.

8

AVOID THE RAM PACK BLUES

MANY users have discovered the joy in using a RAM pack add-on to expand the useable memory in their computer. Most of these same people have also discovered the sorrow of working on a program for hours, only to lose it through a slight jiggle of the machine. That slight jiggle is all that it sometimes takes to cause the RAM pack to come loose. We tape ours on very solidly. We have seen some people using velcro to keep their RAM packs in place. Whatever method you use, be sure it stops those add-ons from becoming fall-offs!

9

BACK UPS, BACK UPS AND MORE BACK UPS

SAVE your programs regularly as you work. Label each save so you know which is the latest. For example, S1., S2., etc. The only rule around our office is in the sign that hangs over the computers: "PROGRAM SAVE EVERY HALF HOUR ... THE SANITY YOU SAVE MAY BE YOUR OWN!"

10

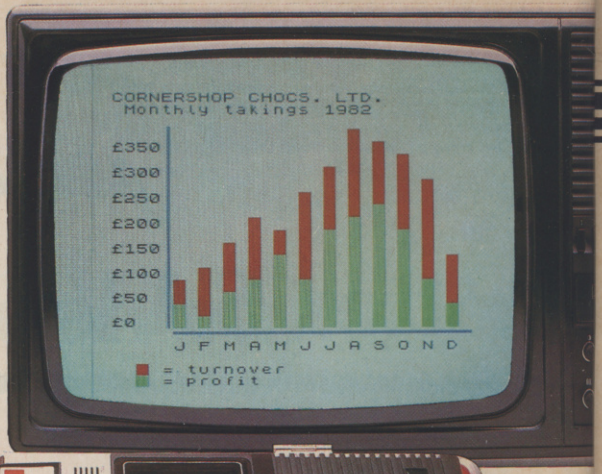
CHANGE TAPES

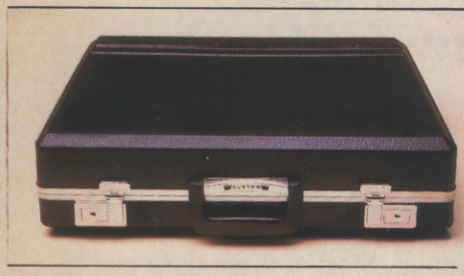
WE'VE saved the least important for last. Don't use the same tape cassette over and over and over again. They do wear out. Use a fresh tape if the program you are saving is important. A worn spot on the tape could be the cause of a lot of misery for you.

Use your computer in the case...
Foam rubber gives complete protection...
Purpose-built for Timex/Sinclair systems...

TS 1000 and 2000 Custom Cases.

Just $79·95 (inc. postage/handling) each.





Turn your Timex/Sinclair system into a portable computing centre!

Your TS hardware – 1000 or 2000 – is designed to work together as a system.

And now there's a simple way to make the most of the fact.

The portable computing centre in a briefcase.

A TS Custom Case holds all your hardware in the most ergonomically sensible positions for easy operation. Each piece of equipment is gripped securely by shock-absorbing foam. Each connecting lead fits under the foam, so there's no chance of tangles. And as each piece is held firmly, connections are excellent.

You can forget wasted time setting up or unhooking the system, too. When you've finished, simply tuck in the mains and TV leads and replace the hinged, lift-off lid. And of course, if you're taking your TS system to college or the office, TS Custom Cases are a lot less cumbersome than a bag or rucksack. And a lot more protective and professional.

Designed by TS enthusiasts – for TS enthusiasts.

Both the TS 1000 and 2000 Custom Cases were designed by a group of TS system users and manufactured by Britain's leading case makers. Made from impact-resistant ABS, each case holds every piece of Timex Sinclair hardware available for the respective computers – plus Learning Lab, manual, software cassettes and any cassette player up to 10½" x 5½". If you haven't all the hardware, simply leave the pre-cut foam in position, then remove it as you get extra pieces of equipment.

And when brand new hardware is introduced, or you upgrade from 1000 to 2000, simply contact us for a replacement foam insert.

TS 1000 Custom Case also available!

Send for your TS Custom Case – now!

TS 1000 and 2000 Custom Cases are guaranteed for two years, and cost just $79.95 (inc. postage) each. Remember you could pay more for an ordinary briefcase.

To order, simply use the coupon. Or telephone 0276 62155 (UK), weekdays.

COMPUTEX CASES

Computex Cases (JBS), Stanhope Road, Camberley, Surrey, GU15 3PS, England.

Please allow 28 days for delivery. 14-day money-back undertaking.

To: Computex Cases (JBS), Stanhope Road, Camberley, Surrey, GU15 3PS, England.

Please send me _____ (qty) TS 1000 Custom Case(s) at $79.95 (inc. airmail postage) each **01.**
Please send me _____ (qty) TS 2000 Custom Case(s) at $79.95 (inc. airmail postage) each **02.**
Please debit my ☐ Mastercard ☐ Visa

account no _____

Please tick box as applicable. PLEASE PRINT.

Signature _____

Name: Mr/Mrs/Ms _____

Street _____

City _____

State _____ Zip _____

Reg. in England no: 991288. TSUS 305

Lifetime's obsession can easily be acquired

BUYING a T/S1000,ZX81 can be the start of a lifetime obsession with home computing. It is easy, however, to become discouraged if everything does not work according to the manual.

For those with only a little knowledge of computers and their capabilities, the best way to approach the T/S1000,ZX81 is to abandon any ideas for special uses. While the basic machine is ideal for learning how to use computers, it is too small for any major uses. It is better to become accustomed to the many facilities and then decide how you wish to use them.

Begin by unpacking the machine, overcoming your surprise at its size and weight and, following the manual, set up the system. If you cannot get the K on the screen, check that everything is plugged into its correct socket and re-set the machine by pulling out the power plug for a second and try tuning in again. If still nothing appears, check the power supply unit by shaking it. If it rattles, return it. If it is satisfactory, check your system with that of a friend.

Once the K appears you are ready to begin learning about the T/S1000,ZX81. It will save family arguments if you can afford a separate television set for your system. It also makes life easier if you have some place to leave your equipment set up permanently. You will find that a few power sockets are needed and a four-way block connector on a short length of extension cable will help to tidy trailing leads.

The manual is written in great detail and is reasonably easy to follow. Some of the chapters may not seem immediately relevant but it is worthwhile reading them since you might miss something which is important.

Come to the T/S1000,ZX81 with a clear mind to make the best use of your new machine.

Patience is needed at this stage to learn the ways in which the computer will accept information. It is tempting to try to enter programs before you are really ready but that is likely to lead to errors. For example, words like AND, THEN, and AT should not be typed in letter by letter. By the time you have reached chapter 11, you should have accumulated sufficient knowledge to be able to type in other people's programs, such as those in *Timex Sinclair User* without too much difficulty.

It is important not to lift the machine when it is in use. Some of the connections can easily work loose and everything which has been put in will be lost.

The manual is not to everyone's taste and if you find it difficult to follow, a number of books on the market can help you. Find the one which suits you best. There will be book reviews in every issue of TIMEX SINCLAIR USER.

As a way of relaxing, you can buy some of the growing range of commercially-produced software. These programs can be loaded directly from cassette but make sure that your machine is big enough to take the tapes you buy. There are some programs for the unexpanded 2K machine but most of them require a 16K RAM pack. Since the tapes vary in quality, it is advisable to read the reviews in *Timex Sinclair User* and use your judgment to find the best.

An alternative method to learn about the T/S1000,ZX-81 is to plunge in at the deep end and see what the computer will do. Refer to the manual when you have difficulties. You can ignore the functions and calculations initially and experiment with PRINT statements to obtain the feel of the machine.

You may have heard already about the problem involved in SAVEing and LOADing your own cassettes. The manual again gives detailed instructions but many of the early machines would not accept tapes from some recorders. That problem is said to have been overcome but there can still be difficulties.

These usually occur when LOADing tapes recorded by other people. One simple method to over-

Use this free info service

To obtain more information on any advertiser or product in *Timex Sinclair User*, circle the appropriate number on the reader service card opposite.

PAGE	ADVERTISER	CIRCLE NUMBER
41	Brainchild	38
6	Byte Back	20
56	Cascade	47
37	Computer and Video Games	31
10	Computer Entrepreneur	22
62	Computex Case	49
40	Cover Craft	35
24-5	DK'Tronics	28
42	Eagle Sales Co.	39
56	Expense Cutter	44
18	E-Z Key	25
56	Felix Software	46
22-3	Gladstone Electronics	27
C3	Gladstone Electronics	53
56	Innovation	48
21	Intercomputer	26
9	Int'l Pub. & Software	21
26	Int'l Pub. & Software	29
47	KSOFT	41
37	Kempston	33
C4	Kopak	54
64	Laserscan	50
C2	Leading Edge	16
2	Melbourne House	18
4	Memotech	19
41	Microdevelopment	36
37	Notting Dale Tech Ctr	32
37	P. Hunter	30
51-4	Prism Microproducts	43
45	Reston Publishing	40
64	Run-It	51
12	Silversoft	23
56	Sinclair Place	45
41	Synchro-Sette	37
14	Synergistic Design	24
48-9	Syntax	42
1	Timex	17
40	Tom Woods	34
64	York 10	52

Get more out of your
TIMEX/SINCLAIR
with software from
RUN-IT!

Many unique programs including:
GRAPH-IT
COMPUTER AWARENESS
REAL ESTATE ADVISOR
MORTGAGE/LOAN ANALYZER
MARKET GURU
MATH & STAT PROGRAMS
New cassette programs every other month!
All with easy-to-use manuals!
SEND FOR FREE CATALOG!

Run-it Software
Dept. 106, 732 S. Sherman
Chicago, IL 60605

For more information, circle 51 on Reader Service Card.

COMPUTER CASSETTES

BASF -DPS
THE WORLD'S FINEST
Data media for all microcomputers. Used nationwide by software manufacturers, hobbyists, schools and businesses. Premium 5-screw shell with leader fits all standard recorders.
SATISFACTION GUARANTEED OR MONEY BACK.

ITEM	1 DOZ.	2 DOZ.
C-05	☐ 7.50	☐ 13.50
C-10	☐ 8.00	☐ 14.40
C-20	☐ 10.00	☐ 18.00
Hard Box	☐ 2.50	☐ 4.00

Send for free brochure. Ask for quantity discounts. Calif. residents add sales tax. SHIPPING HANDLING (UPS) 1 doz. $2. 2 doz. $3.50. 3 doz. $4.50. ea. additional doz. $.50. For parcel post instead of UPS, add $1. Outside Continental USA, add $2.

FOR IMMEDIATE SHIPMENT
USE YOUR VISA OR MASTERCARD CALL 213/710-1430

YORK 10™ Computerware
24573 Kittridge St., TS Canoga Park, CA 91307

For more information, circle 52 on Reader Service Card.

ATTENTION
TIMEX/Sinclair 1000
and Sinclair ZX-81 owners
If you haven't bought a 16K RAM pack yet because they're too expensive or because you simply don't feel like waiting around for a couple of months, then take a look at ours. Our 16K RAM pack is only $39.95 for a kit and is available for immediate delivery.

NOT ONLY THAT, but our RAM packs are significantly more reliable than others you've seen advertised at a higher price.

STATE-OF-THE-ART DESIGN

16K RAM PACK $39.95
Assembled and tested-$44.95, case $4.95.
Shipping and handling $2.95.
Florida residents please add 5% sales tax.

Laserscan Electronics Corporation
2305 Broadway, Riviera Beach, FL 33404
(305) 842-4255 (let ring)
Please call or send SASE for information. We will send you our information sheet along with a FREE tic-tac-toe listing.

For more information, circle 50 on Reader Service Card.

people. One simple method to overcome this is to wind the tape to the middle of the program and type LOAD " " followed by NEWLINE; then slowly increase the volume of the recorder with the tape running until the television screen shows four or five thick horizontal black bands. If you then rewind the tape, the program should LOAD normally.

Finally, a health warning. Apart from any practical uses, computing with your T/S1000,ZX81 can be a very entertaining hobby and is almost certainly habit-forming. You may easily find yourself crouched

over your machine, red-eyed, in the early hours of the morning, thinking that in another five minutes you will sort out the problem.

Try to break that habit by getting into the fresh air and meeting other Timex Sinclair users.

By obtaining a T/S1000,ZX81 you find that you have joined a not very exclusive club with thousands of members, many of whom would be only too happy to advise you if you have difficulties.

Make sure of your regular copies of *Timex Sinclair User* and you can be guaranteed many happy hours with your Timex Sinclair machine.

e/e

GET IT MONTHLY!

timex sinclair user

To get your subscription started,

PHONE NOW

800-543-3000 and ask for operator 243. Have your VISA or MASTERCARD ready, or

PRINT OR TYPE YOUR NAME

and address on the attached card. Mail the card to us and we'll start your subscription immediately.

SUBSCRIBE WITH CONFIDENCE.

If you ever feel that TIMEX SINCLAIR USER isn't helping you get more from your computer, you may cancel at any time. We will refund the value of any unmailed issues and you still keep your free $15.00 "Packrabbit" software game.

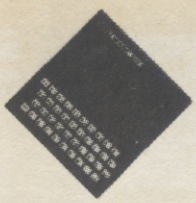
MAIL TO

SUBSCRIPTIONS
49 LaSalle Avenue
Buffalo, N.Y. 14214

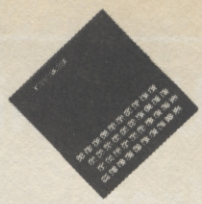
FREE INFORMATION

To get more information about any products advertised or mentioned in this month's issue just take these three steps.

1. *Print or type your name and address on the attached card.*
2. *Circle the number(s) on the card that correspond to the reader service numbers at the bottom of the advertisement or article.*
3. *Mail the card and free information will be mailed back to you.*



Subscribe Now!



PLEASE PRINT

NAME

STREET

CITY

STATE ZIP PROV. CODE

COUNTRY

U.S.A.
ONE YEAR
(12 ISSUES) $29.95

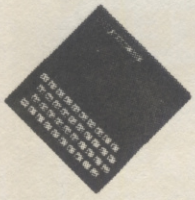
CANADA
ONE YEAR
(12 ISSUES) $35.95

PAYMENT ENCLOSED
☐ CHECK ☐ MONEY ORDER
☐ VISA ☐ MASTERCARD

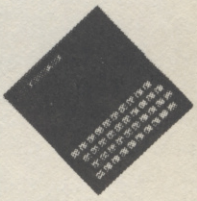
CARD NUMBER EXPIRES

SIGNATURE

Allow 6 to 8 weeks for delivery.



Subscribe Now!



PLEASE PRINT

NAME

STREET

CITY

STATE ZIP PROV. CODE

COUNTRY

U.S.A.
ONE YEAR
(12 ISSUES) $29.95

CANADA
ONE YEAR
(12 ISSUES) $35.95

PAYMENT ENCLOSED
☐ CHECK ☐ MONEY ORDER
☐ VISA ☐ MASTERCARD

CARD NUMBER EXPIRES

SIGNATURE

Allow 6 to 8 weeks for delivery.

Reader Service Card

CIRCLE FOR INFORMATION
Zip code necessary.
This card valid for 90 days.

PLEASE PRINT

NAME

STREET

CITY

STATE ZIP PROV. CODE

COUNTRY

1400

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70

PLACE STAMP HERE

timex sinclair user

SUBSCRIPTIONS
49 LaSalle Avenue
Buffalo, N.Y. 14214

PLACE STAMP HERE

timex sinclair user

SUBSCRIPTIONS
49 LaSalle Avenue
Buffalo, N.Y. 14214

PLACE STAMP HERE

timex sinclair user

READER INFORMATION SERVICE
49 LaSalle Avenue
Buffalo, N.Y. 14214

GET IT MONTHLY!

timex sinclair user

To get your subscription started,

PHONE NOW
800-543-3000 and ask for operator 243. Have your VISA or MASTERCARD ready, or

PRINT OR TYPE YOUR NAME
and address on the attached card. Mail the card to us and we'll start your subscription immediately.

SUBSCRIBE WITH CONFIDENCE.

If you ever feel that TIMEX SINCLAIR USER isn't helping you get more from your computer, you may cancel at any time. We will refund the value of any unmailed issues and you still keep your free $15.00 "Packrabbit" software game.

MAIL TO
SUBSCRIPTIONS
49 LaSalle Avenue
Buffalo, N.Y. 14214

FREE INFORMATION

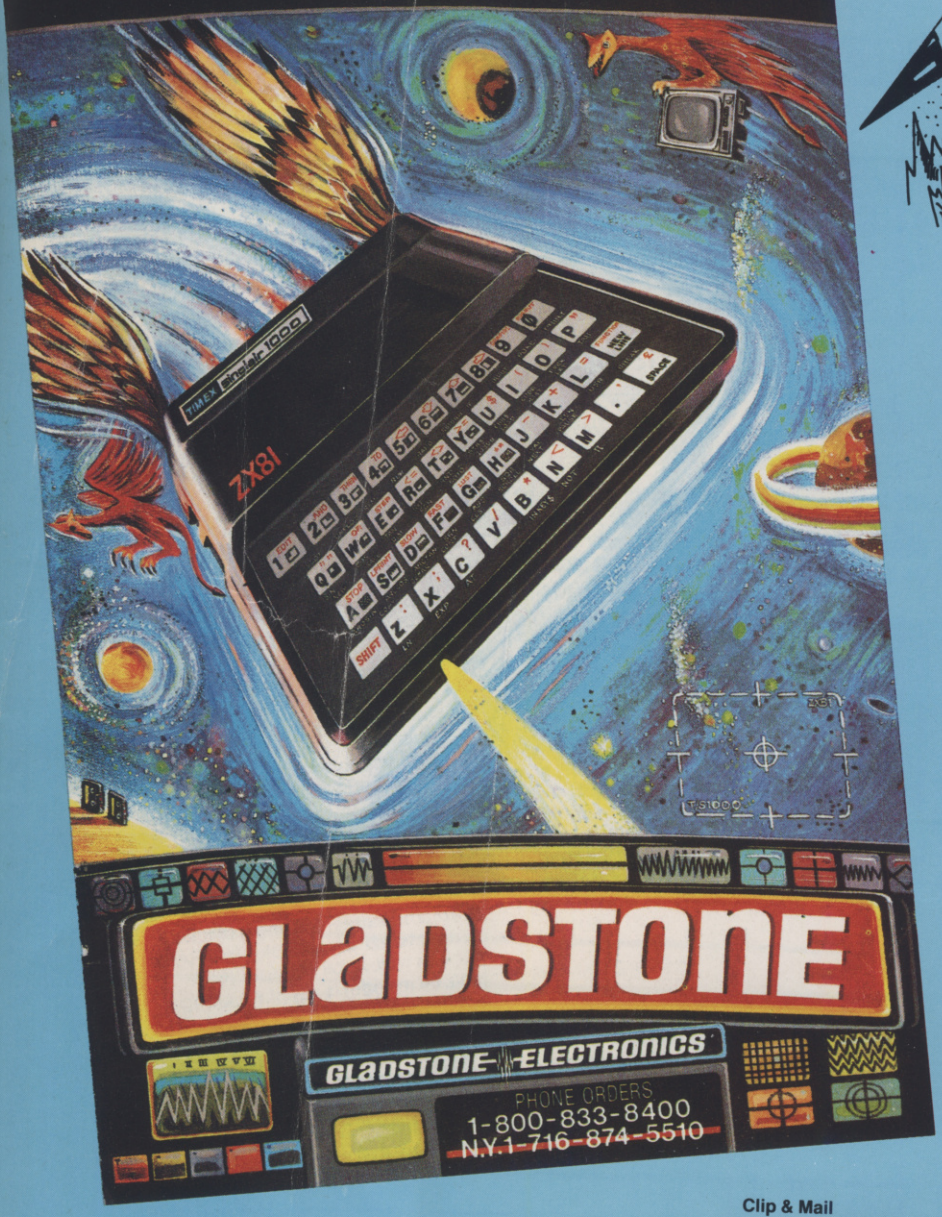
To get more information about any products advertised or mentioned in this month's issue just take these three steps.

1. *Print or type your name and address on the attached card.*
2. *Circle the number(s) on the card that correspond to the reader service numbers at the bottom of the advertisement or article.*
3. *Mail the card and free information will be mailed back to you.*

YOUR TS1000/ZX81 NEVER HAD IT SO GOOD!

ZX81 & T/S 1000 CATALOG

SOFTWARE/HARDWARE/BOOKS



Send for your FREE catalog Today!

NEW from Gladstone Electronics! Our TS1000/ZX81 catalog will take you where no other has gone before! You will view the widest selection of up-to-date software, books and hardware add-ons available to get the most from your personal computer. This exciting new 34 page color catalog lists arcade, fantasy and family games, business and educational programs; books for beginners as well as experienced users; hardware add-ons and other peripherals for use with your TS1000/ZX81 Home Computer! Use the convenient coupon below and send for your FREE catalog TODAY!

GLADSTONE ELECTRONICS

1585 Kenmore Ave., Buffalo, N.Y. 14217

Call toll free 1-800-833-8400
N.Y. (716) 874-5510
In Canada call toll free 1-800-268-3640

For more information, circle 53 on Reader Service Card.

Clip & Mail

ORDER FORM

Mail orders to: Gladstone Electronics Inc.,
1585 Kenmore Ave., Buffalo, N.Y. 14217

Please RUSH my FREE catalog to me Today!

Name _____

Address _____

City _____ State _____ Zip _____

KOPAK

Creations Inc.

ACCOUNTS

Your own PERSONAL OR SMALL BUSINESS accounting system. Contains refinements not usually found in this type of program. "200 Transaction file" can be SEARCHED, PRINTED or DISPLAYED. This program has been throughly tested, and improved through extensive use.

ORDER No. 03-1022 **$19.95**

AUTOFILE

An ELECTRONIC FILING SYSTEM that can be used for ANY type of data. Set up your own DATA-BASES with this easy to use, menu-driven program with AUTO-SEARCH facility.

ORDER No. 03-1021 **$19.50**

BREAKOUT

Fast MACHINE CODE arcade-type game. If you haven't tried THIS version, you haven't played "BREAKOUT" on the ZX81/TS1000.

ORDER No. 03-4028 **$14.95**

COMPOSER

Enables you to play any tune through your T.V. speaker, your cassette recorder or through an A.M. radio. With 'COMPOSER' you can control the duration of each note. And you can save your song on tape.

ORDER No. 03-3012 **$19.95**

G R A F I X

Draw and store complex images. Permits you to create, mix, and save your own screen artwork. You can mix graphics created with GRAFIX into another program. By itself or on tape. This program is a "must" for the CREATIVE PROGRAMMER.

ORDER No. 03-6005 **$14.95**

Z-99™ (Improved 'M'-Coder)

Now you can write MACHINE CODE PROGRAMS on your ZX81/TS1000 with Z-99. The best true MACHINE CODE COMPILER for the ZX81/TS1000 computer. Simply write your new program in BASIC (or load an EXISTING PROGRAM), press a key and Z-99 will automatically compile it into MACHINE CODE for you. Give all your programs that SUPER—FAST professional look. Order Z-99 NOW to revolutionize your programming. Once you try Z-99 you'll never write basic programs again!

ORDER No. 03-5271 **$19.95**

PUCKMAN

Superb fast moving MACHINE-CODE fun. Have an exciting time playing this EXCELLENT version of the popular arcade game.

ORDER No. 03-4027 **$14.95**

'TOUCH-A-MATIC'™

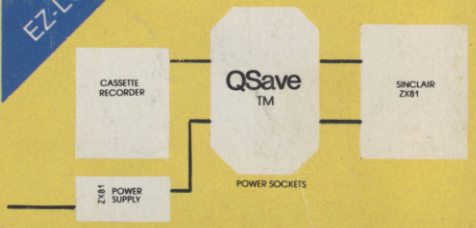
$9.95

POWER AT YOUR FINGER TIPS!

ORDER No. 01-0007

KOPAK'S "TOUCH-A-MATIC" gives you the power to type more accurately and faster. It requires NO WIRES, NO SOLDERING. It's as easy as removing the adhesive backing and pressing it into position.

EZ-LOADER™



LOADS & SAVES 16 K file in 26 seconds instead of 7 minutes! Cleans up signal for a cleaner load. • STRONGER, SHARPER DIGITAL SIGNAL • CLEANER, FILTERED POWER • ENCODES YOUR PROGRAM AND/OR DATE • Save time/Save energy • Baud rate increases from 250 to over 4000 bps. A must for all ZX81/TS1000 owners.

ORDER No. 04-1010 **$39.95**

Dealer Inquiries Invited

For more information, circle 54 on Reader Service Card.

ORDER FORM

TO AVOID DELAY PRINT CLEARLY

MAIL THIS FORM WITH PAYMENT TO:

KOPAK Creations Inc.
119 Peter St.
Union City, NJ 07087
(201) 864-4410

STOCK NUMBER AND DESCRIPTION	HOW MANY	TOTAL

NAME _____

ADDRESS _____

CITY STATE ZIP

Sub-Total		$
Add sales tax		$
Packing & Shipping (See Chart)		$
Total amount enclosed or to be charged to my credit card		$

SHIPPING

up to $9.99 to $14.99 add $2.00
from $15.00 to $19.99 add $2.50
from $20.00 to $24.99 add $2.85
from $25.00 to $29.99 add $3.45
from $30.00 to $39.99 add $3.70
from $40.00 to $49.99 add $3.95
over $50.00 add $4.25

CHARGE

VISA ☐

MASTER CARD ☐

INTERBANK NO. _____ EXP. DATE _____ MO YEAR

Sign _____

In Canada call Datronics (416) 496-2243